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STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
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HONOLULU, HAWAII 96805

May 26, 2004

To: The Honorable Genevieve Salmonson, Director
Office of Environmental Quality Control

From: Micah A. Kane, Chairman
Hawaiian Homes Commission

Subject: Makuu Offsite Water System Phase 2
Final Environmental Assessment and
Finding of No Significant Impact (FONSI)
Makuu & Halona, Puna, Island of Hawaii, Hawaii

The Department of Hawaiian Home Lands (DHHL) has reviewed the comments received during the Draft Environmental Assessment 30-day public comment period that began on February 23, 2004 and ended March 24, 2004.

Based on this review, DHHL has determined that this project will not have significant environmental effects and has issued a Finding of No Significant Impact (FONSI).

The Hawaiian Homes Commission approved this determination at its May 25, 2004 meeting.

We have enclosed a completed OEQC *The Environmental Notice* Publication Form, four copies of the Final Environmental Assessment (FEA), a copy of the FEA Distribution List, and a hard copy of the project summary. The electronic data file of the project summary has already been forwarded directly to your office by our consultant, Mr. Ron Terry of Geometrician Associates, LLC.

Please publish a notice of availability for the FEA in the Office of Environmental Quality Control's (OEQC) June 8, 2004 edition of *The Environmental Notice*. Should you have any questions regarding the contents or preparation of the FEA, please contact Mr. Ron Terry at (808) 982-5831.

Should you have any questions regarding the project itself, please call Larry Sumida, Chief of our Planning and Development Branch at 586-3819 or call William Makanui of our Planning and Development Branch at 586-3818.

Enc.

c: Engineers Surveyors Hawaii, Inc. (w/o encl.)
Geometrician Associates, LLC (w/o encl.)
DHHL, LDD, PDB (w/o encl.)

2004-06-08 FONSI
MAKUU OFFSITE WATER SYSTEM PHASE 2

MAKU`U OFFSITE WATER SYSTEM PHASE 2
MAKU`U, ISLAND OF HAWAI`I
STATE OF HAWAI`I

FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

Submitted Pursuant to Chapter 343, Hawai`i Revised Statutes (HRS)

State of Hawai`i
Department of Land and Natural Resources

June 2004

MAKU`U OFFSITE WATER SYSTEM PHASE 2
MAKU`U, ISLAND OF HAWAI`I

FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

Tax Map Key Number: (3rd):
1-5-08:01 (por.); & 08 (por.)

PROPOSING AGENCY:

State of Hawai`i
Department of Hawaiian Home Lands

CONSULTANT:

Geometrician Associates
HC 2 Box 9575
Keaau, Hawai`i 96749

and

Engineers Surveyors Hawaii, Inc.
900 Halekauwila Street
Honolulu HI 96814

CLASS OF ACTION:

Use of State Funds
Use of State and County Land

This document is prepared pursuant to:
the Hawai`i Environmental Protection Act,
Chapter 343, Hawai`i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai`i Department of Health Administrative Rules (HAR).

SUMMARY

The Hawai'i State Department of Hawaiian Home Lands (DHHL) has identified the need to develop additional potable water for its Maku`u Farm and Agricultural Lots. Accordingly, DHHL proposes construction, on State of Hawai'i land near the 824-foot elevation at Maku`u, of an exploratory and production well, reservoir, access road, pipeline, electrical poles and lines, and appurtenant facilities.

The first phase of development of the Maku`u Farm and Agricultural Lots in 1998 included building a well at the existing Keonepoko-Nui 2 well/reservoir. The facilities were dedicated to the County of Hawai'i. As anticipated in the master plan for the water system, the new proposed well would supplement this supply and provide water for existing and additional Maku`u lots, the scope of which will be determined by pump tests for the well. The well would tap the 222 square-mile Pahoa Aquifer System, which has an estimated sustainable yield of 435 million gallons per day (mgd) and current uses of less than 2.0 mgd. The budget for the project, which is funded by the Hawai'i State Department of Hawaiian Home Lands, is approximately $5.8 million. This estimate will be refined through final design. Design would be finished and construction would begin after completion of the EA. The exploratory well is scheduled for completion in early 2005. If the well pump tests that the well is suitable for production, the production well, reservoir and appurtenant facilities would be completed by late 2006.

No adverse impact upon the sustainable yield of the aquifer will occur. Water quality tests will be conducted to ensure that, consistent with expectations, the well will yield high-quality potable water with either non-detectable or minimal contaminants. No threatened or endangered species are present; sandalwood patches near the access road will be avoided, as practical. DHHL will allow interested parties the opportunity to salvage *Scaevola kilauege* plants, as practical. In response to concerns from the U.S. Fish and Wildlife Service, DHHL will commit to avoid night work on the project, which may attract and confuse several listed threatened or endangered seabird species. An archaeological and cultural inventory concluded that no significant historic or cultural sites are present; on-site monitoring during grading is proposed in case historic sites, burials or caves are found. Noise and visual impacts will be negligible. Erosion control and dust control plans will be developed.

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LIST OF ABBREVIATIONS

ALISH	Agricultural Lands of Importance to the State of Hawaii
BMP	Best Management Practice
CDUP	Hawai`i State Conservation District Use Permit
DLNR	Hawai`i State Department of Land and Natural Resources
DWS	Hawai`i County Department of Water Supply
EA	Environmental Assessment
EIS	Environmental Impact Statement
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
gpm	Gallons per minute
HDOH	Hawai`i State Department of Health
HAR	Hawai`i Administrative Rules
HEPA	Hawai`i Environmental Policy Act
HCGP	Hawai`i County General Plan
HRS	Hawai`i Revised Statutes
MCL	Maximum Contaminant Level
mgd	Million gallons per day
mg/L	Milligrams per liter
OEQC	Hawai`i State Office of Environmental Quality Control
SFHA	Special Flood Hazard Area
SHPD/O	State Historic Preservation Division/Officer
SMA	Special Management Area
UH	University of Hawai`i
USF&WS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USNRCS	U.S. Natural Resources Conservation Service

1 PROJECT LOCATION, DESCRIPTION, PURPOSE AND NEED

1.1 Project Location, Purpose and Need

The Hawai'i State Department of Hawaiian Home Lands (DHHL) has identified the need to develop additional potable water for its Maku`u Farm and Agricultural Lots. Accordingly, DHHL proposes construction, on State of Hawai'i land near the 824-foot elevation at Maku`u[1], of an exploratory and production well, reservoir, access road, pipeline, electrical poles and lines, and appurtenant facilities (Figs. 1-2).

DHHL's *Hawai`i Island Plan* (DHHL 2002:21) recommends the Maku`u Mauka area for residential homestead, subsistence agriculture, community and cultural uses. In order to provide for the orderly development of water infrastructure, DHHL commissioned the *Master Plan Water System Study, Maku`u Farm and Agricultural Lots* in 1994. The first phase of development of the Maku`u Farm and Agricultural Lots in 1998 included building a well at the existing Keonepoko-Nui 2 well/reservoir. The facilities were dedicated to the County of Hawai'i. As anticipated in the master plan for the water system, the new proposed well would supplement this supply and provide water for existing and additional Maku`u lots. The proposed water improvements are currently expected to serve components of both Phase 1 and Phase 2 of the Maku`u Farm and Agricultural Lots subdivision. The Phase 1 areas served would be 28 five-acre lots and 50 two-acre lots, which have already been subdivided. Also, the improvements would serve additional lots that will be subdivided as part of Phase 2, which will occur on the remaining 537 acres mauka of Highway 130. The precise subdivision plan has not been decided upon, but lot schemes under consideration include:

- 198 two-acre lots (as outlined in the master plan for the water system);
- A mix of subsistence agricultural (less than 5 acres) and 20,000-squarefoot residential lots, as shown in the *Hawai`i Island Plan* (Hawai`i DHHL 2002); and
- 600 to 1,000 20,000-square foot lots.

If pump tests prove adequate, the well may supply water for the full development. The well would tap the 222 square-mile Pahoa Aquifer System, which has an estimated sustainable yield of 435 million gallons per day (mgd) and current uses of less than 2.0 mgd.

1.2 Water System Details

The Hawai`i County Department of Water Supply (DWS) is responsible for planning and operating water sources and systems that implement the County's General Plan. DWS currently operates and maintains twenty-three separate water systems. There are four public water systems in the Puna district: Ola`a-Mt. View, Pahoa, Kapoho, and Kalapana. The total average

1 The affected area includes land within the *ahupua'a* of Hālona, Pōpōkī, and Maku'u but is generally referred to as Maku`u in this report.

consumption of these systems is 1.2 mgd. The Pahoa water system, located in the geographic center of the lower Puna region, extends from Keonepoko Homesteads down along portions of the Kapoho and Pohoiki Roads to Kapoho. The present average consumption is 0.40 mgd, which is derived from two deepwells at Keonepoko and two deepwells at Pahoa. This system is now interconnected with the Ola`a-Mt. View water system.

1.3 Project Components

In overview, the project consists of:

- Construction of an exploratory well.
- Testing the well for capacity and water quality.
- Conversion of the well to production.
- Construction of a 1.0 million gallon reservoir.
- Construction of a gated access road to the site.
- Construction of a pipeline from the reservoir site to the existing Keonepoko 2 Reservoir.
- Installation of electrical poles and lines from along access road.
- Installation of a new booster pump at the Keonepoko 2 Reservoir.
- Installation of appurtenant facilities, including a control building and chlorinator, valves, electrical facilities, storm drains, and fencing.

The ground elevation at the well will be about 824 feet above mean sea level. The well will have a solid, 16-inch diameter casing to a depth of 820 feet, with perforated casing below that to a depth of 900 feet (Fig. 2-a). The pump capacity is expected to be 700 gallons per minute (gpm), a rate that will be verified by pump tests and adjusted if necessary. The well will then be integrated into the Hawai`i County Department of Water Supply (DWS) water system. A 1.0 million gallon reservoir will also be built on the site. The gated access road and pipeline will lead from the well site to the mauka edge of the Maku`u subdivision and thence to the Keonepoko 2 Reservoir. Site plan details will be finalized during the design stages of the project, and the precise layout of features on the well site is not yet available. For illustration purposes, Figure 2a depicts the exploratory well cross section; Figure 3b, elevations for a typical control building (the actual design of the control building will not occur until the production well phase); and Figure 2c, the access road/utility easement cross-section.

The budget for the project, which is funded by the Hawai`i State Department of Hawaiian Home Lands, is approximately $5.8 million. This estimate will be refined through final design. Design would be finished and construction would begin after completion of the EA. The exploratory well is scheduled for completion in early 2005. If the well pump tests indicate that the well is suitable for production, the production well, reservoir and appurtenant facilities would be completed by late 2006.

1.4 Alternatives Considered

1.4.1 Production Well Alternative

This refers to the proposed project, which is described in Section 1.3, above.

1.4.2 Alternative Water Well Sites

The feasibility of alternative well sites was considered during the planning process based on several criteria. These included proximity and proper elevational relation to where the water would be utilized, proximity and proper elevational relation to existing transmission and storage facilities, minimization of transmission distance, minimization of potential for current or future contamination, location on State land (if possible), and minimization of total environmental impact. If hydrologically appropriate, any well directly upslope from the DHHL Maku'u lands would theoretically meet these criteria. Originally, a site closer to the Maku'u-Keonepoko boundary was selected for the well. Environmental investigations indicated that it might be too close to a sensitive lava tube cave, and a more suitable location to the west was selected. The general site was by the only site that reasonably met all criteria, and it was thus unnecessary to consider other specific sites in detail.

1.4.3 Surface Water, Catchment, Wastewater Re-Use, and Desalination

Surface water is used in certain locations in Hawai'i, but Puna lacks permanent surface water sources. In any case, compliance with State and federal requirements for surface water necessitates costly water treatment plants.

Rainfall catchment is used in many parts of Hawai'i County, and in fact is the most common water system for residents of Puna, where County water service is not widely available. Although catchment does provide a potable water source of last resort, it has many drawbacks, including high maintenance costs and susceptibility to microbiological and chemical contamination. Sources of these contaminants vary from dead animals in the storage tank to materials eroded or leached from roofs, gutters and paint. The State Department of Health (DOH) recommends using catchment water for non-consumptive needs and obtaining drinking or cooking water from regulated public water systems and/or purchased bottled drinking water.

Wastewater re-use can be an important source of water, particularly for irrigation, although treatment expense may elevate the cost of the water beyond the budget of agricultural users. In situations with critical water shortages, the cost of treated wastewater can be borne by municipal users, who then are able to utilize surface water or groundwater that would otherwise be used for irrigation. Such measures would appear to be currently infeasible for the Maku'u DHHL lots, which lack a municipal wastewater treatment plant. They are also unnecessary, given the relatively low use of abundant groundwater resources.

Similarly, DWS and other agencies concerned with developing and utilizing water on the Big Island consider desalination, an energy-intensive and expensive process, to be unjustified for cost reasons on the island of Hawai'i and unnecessary to consider when better options exist.

1.4.4 Optimize Distribution of Existing Potable/Non-Potable Supplies

Delivery of non-potable water requires dual distribution systems, and is thus expensive. Such systems are sometimes justified when there is high demand for irrigation water by existing users of potable water. For the period 2010-2020, the State of Hawai'i plans construction of wells, storage facilities and transmission lines to deliver up to 1.47 mgd of irrigation water to the Maku'u Farm and Agricultural lots (Hawai'i State CWRM 2003) to meet the needs of agricultural users. This project, if built, cannot substitute for the proposed project, which will answer an immediate need for potable water.

1.4.5 Conservation/Demand Side Strategies Alternative

According to agency officials, current conservation activities at DWS include the following:

- *100 percent customer metering.* All customer accounts are metered.
- *Meter repair/replacement programs.* Testing, repair and replacement of water meters are done on a systematic basis.
- *Water analysis/reports.* The difference between metered source production and metered sales to consumers is monitored to determine whether a leak detection program is justified.
- *Leak detection programs.* DWS is implementing investigations and repair for suspected sections of leaking pipelines.
- *Tank overflow controls/alarms.* These facilities prevent system losses from unnecessary overflows.
- *Voluntary water restriction notices.* DWS requests voluntary water conservation during dry periods and emergency water outages.
- *Public education outreach/education programs.* Exhibits in trade shows, the County fair, and public schools, among other venues, allow DWS to share information about the potable water system and water conservation.

These existing and future water conservation programs are expected to reduce the growth of future water demand. In particular, an island-wide reduction in non-metered water use is expected to be realized. Rather than an alternative to developing new sources, water conservation is seen by DWS as an integral and ever-increasing part of its strategy to provide safe, affordable and reliable water service to the island of Hawai'i in a sustainable and financially secure manner.

1.4.6 Selection of Project Alternative

DHHL has determined that the most rational and efficient strategy for dealing with the need for reliable supply for the Maku`u DHHL lots is to construct an exploratory well at the project site, and then to convert the exploratory well to production if pump tests and water quality tests are successful. The decision to advance this alternative was based on the high probability of finding a well with successful yield and good water quality, the lack of impact on aquifer sustainability, and the fact that no alternative sources (such as catchment, wastewater reuse, or desalination) would provide a practical or economical source of potable water in this service area.

1.5 Consistency with Government Plans and Policies

The project is highly consistent with government plans and policies, which in general call for water systems that meet the needs of residents, support planned growth, and minimize environmental degradation. The following sections discuss consistency with key plans.

1.5.1 Hawai`i State Plan

The Hawai`i State Plan was adopted in 1978. It was revised in 1986 and again in 1991 (Hawai`i Revised Statutes, Chapter 226, as amended). The Plan establishes a set of goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The proposed project is consistent with State goals and objectives that call for increases in employment, income and job choices, and a growing, diversified economic base extending to the neighbor islands.

The sections of the Hawai`i State Plan most relevant to the proposed project are centered on the theme of facility systems. The following objectives and policies are taken from the section dealing with water development.

- Objective a): Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational and other needs within resource capacities.
- Objective b: To achieve the facility systems water objective, it shall be the policy of this State to:
    - (1) Coordinate development of land use activities with existing and potential water supply.
    - (2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.
    - (3) Reclaim and encourage the productive use of runoff water and wastewater discharges.
    - (4) Assist in improving the quality, efficiency, service and storage

capabilities of water systems for domestic and agricultural use.

(5) Support water supply services to areas experiencing critical water problems.

(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.

The proposed project supports all relevant objectives and policies of the Hawai`i State Plan.

1.5.2 Hawai`i Water Plan

The *Hawai`i Water Plan* includes plans dealing with water resource protection, water quality, and development plans related to each individual county, to State projects, and to agricultural water systems. The most relevant plans for this discussion are the *Hawai`i State Water Resources Development Plan* (Hawai`i DLNR 1980) and the *State Water Projects Plan, Volume 2, Island of Hawai`i* (Hawai`i State Commission on Water Resources Management 2003).

The purpose of the *Hawai`i State Water Resources Development Plan* is to set forth specific objectives, policies, programs and projects to guide State and County governments. In summary, this plan presents guidelines for development of water resources for municipal, agricultural and industrial requirements; preservation of ecological, recreational, and aesthetic values and quality; and regulation of the use of water to assure adequate supplies for the future. The proposed project would develop a municipal water source in a rational manner to improve drinking water quality, assure adequate water for planned growth and would not adversely affect ecological, recreational or aesthetic values. The project is thus consistent with the basic guidelines of the plan.

In particular, the following objectives are noteworthy:

Objective A. Assure adequate municipal water supplies for planned urban growth.
Objective B. Support long-range municipal water supply planning by the counties.
Objective C. Promote municipal water conservation.
Objective D. Improve drinking water quality.
Objective E. Upgrade rural water systems.

Because there is no current or foreseeable threat of exceeding sustainable levels of withdrawal from the aquifer in the Pahoa area, it has not been declared a Groundwater Management Area by the State Commission on Water Resources Management. The proposed project supports or is not inconsistent with each objective of the plan.

The primary objective of the *State Water Projects Plan, Volume 2, Island of Hawai`i* (SWPP) is to provide a framework for the planning and implementation of water development strategy for

future State projects. The SWPP recognizes the need for both potable and non-potable water for the Maku'u Farm and Agricultural Lots, projecting a total need of about 1.54 mgd by the year 2020. Water development to meet the 1.47 mgd, non-potable component of this need is part of the recommended long-term strategy for the State, during the 2011-2020 time-frame. The Maku'u Offsite Water System, Phase II project would provide for potable water needs and interim non-potable needs, and it is thus consistent with the SWPP.

1.5.3 Hawai'i County Water Use and Development Plan

The *Hawai'i County Water Use and Development Plan* (HCWUDP) (Hawai'i County DWS 1989). The HCWUDP is the most recent Hawai'i County water plan to be formally adopted by DWS and the Hawai'i State Commission on Water Resource Management (CWRM).[2] The Plan is meant to aid CWRM in granting permits for water use and designating water management areas, as well as serving as a reference document of current and future water resource conditions. The Plan includes an inventory of existing water uses and developments by hydrologic units, addresses future land uses and related water needs, and is consistent with State and County land and water policies. This plan also guides DWS in future operations and to identify the improvements and facilities required to continue to provide safe, affordable and reliable water service to the island of Hawai'i in a sustainable and financially secure manner.

The *Hawai'i County Water Use and Development Plan* estimated future public water needs in the Pahoa area at 5.5 mgd, which it should be noted, is many times greater than current usage. Long-term plans call for installation of up to 6.0 mgd of pumping capacity and 8.0 mg of storage. The proposed project is consistent with the plan in that it provides additional source and storage capacity.

1.5.4 Hawai'i County General Plan

The *General Plan* for the County of Hawai'i is the document expressing the broad goals and policies for the long-range development of the Island of Hawai'i. The plan was adopted by ordinance in 1989. The *General Plan* is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai'i. Below are pertinent Goals, Objectives, Policies and Standards, and Courses of Action sections related to Water Systems Development, followed by a discussion of conformance. In addition, the most relevant sections of aspects of the General Plan are briefly discussed.

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[2] An update of the Plan (Hawai'i County DWS 1991) was performed but never formally adopted. The update contained no significant differences concerning water use or water facility needs for the Puna District.

In recognition that the *General Plan* is currently in the final stages of a periodic update and is likely to be adopted soon, the following references include language from the revisions (Ibid website address). Additions to the 1989 language are in bold and underlined, and deletions are bracketed.

It should be noted that the *General Plan* is not intended as a guide for development of Hawaiian Home Lands. The intent of this review is to not to evaluate whether the project conforms to the *General Plan* but rather to determine whether it conflicts with or is contrary to it in any respects.

1.5.4.1 General Plan and Water Systems

POLICIES

- Water system improvements [and extensions] shall [promote] **correlate with** the County's desired land use development pattern.
- All water systems shall be designed and built to Department of Water Supply standards.
- Improve and replace inadequate systems.
- Water sources shall be adequately protected to prevent depletion and contamination from natural and man-made occurrences or events.
- Water system improvements should be first installed in areas [which] **that** have established needs and characteristics, such as occupied dwellings**, agricultural operations** and other uses, or in areas adjacent to them if there is need for urban expansion [, or to further the expansion of the agricultural industry].
- A [systematic program] **coordinated effort** by [the] County, State and private [interest] **interests** shall **be developed to** identify sources of additional water supply **and be implemented** to ensure the development of sufficient quantities of water for **existing and** future needs of high growth areas[.] **and agricultural production.**
- The fire prevention systems shall be coordinated with water distribution systems in order to ensure water supplies for fire protection purposes.
- [The County shall consider the feasibility, desirability, and the attendant responsibilities of establishing] **Develop and adopt** standards for individual water catchment units.
- **Cooperate with the State Department of Health to develop standards and/or guidelines for the construction and use of rainwater catchment systems to minimize the intrusion of any chemical and microbiological contaminants.**
- **Cooperate with appropriate State and Federal agencies and the private sector to develop, improve and expand agricultural water systems in appropriate areas on the island.**
- **Promote the use of ground water sources to meet State Department of Health water quality standards.**

- o **Continue to participate in the United States Geological Survey=s exploratory well drilling program.**
- o **Seek State and Federal funds to assist in financing projects to bring the County into compliance with the Safe Drinking Water Act.**
- o **Develop and adopt a water master plan that will consider water yield, present and future demand, alternative sources of water, guidelines and policies for the issuing of water commitments.**
- o **Expand programs to provide for agricultural irrigation water.**

STANDARD

- o [Water] **Public and private water** systems shall meet the requirements of the Department of Water Supply and the Subdivision Control Code.

COURSES OF ACTION FOR PUNA

- o [Improve] **Continue to improve** inadequate water system facilities.
- o Water source investigation and exploration should be continued in order to provide service for anticipated needs.
- o **Investigate additional groundwater sources in the Olaa area.**
- o **Investigate alternative means to finance the extension of water systems to subdivisions that rely on catchment.**

Discussion: The proposed project is completely consistent with all elements of the General Plan dealing with water systems. In particular, it would correlate with the County's desired growth pattern by servicing areas already identified for urban and rural growth, with established needs and characteristics. The project would be designed and built to DWS standards. As discussed in Section 3.1.2 below, the project adequately protects the aquifer from depletion and contamination from natural and man-made sources. The project involves promotion of the use of ground water sources (as opposed to surface water) to meet State Department of Health water quality standards. Finally, it provides new sources and storage for projects specific to Puna. Implementation of the proposed project would not conflict with any goals, policies or courses of action, and would, in fact, contribute to their fulfillment.

1.5.4.2 Other Selected Elements of General Plan

ECONOMIC GOALS

- o [The County shall provide]**Provide** an economic environment [which] **that** allows new, expanded, or improved economic opportunities that are compatible with the County's **cultural,** natural and social environment.

ENVIRONMENTAL QUALITY POLICIES

- [The County of Hawaii shall take] **Take** positive action to further maintain the quality of the environment [for residents both in the present and in the future].

ENVIRONMENTAL QUALITY STANDARDS

- Pollution shall be prevented, abated, and controlled at levels [which] **that** will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
- [Environmental] **Incorporate** environmental quality controls [are to be incorporated] either as standards in appropriate ordinances or as conditions of approval.

HISTORIC SITES GOALS

- Protect, **restore,** and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.

HISTORIC SITES POLICIES

- [The County of Hawaii shall require] **Require** both public and private developers of land to provide [a] historical **and archaeological** [survey] **surveys and cultural assessments, where appropriate,** prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
- Public access to significant historic sites and objects shall be acquired[.]**, where appropriate.**

AGRICULTURAL LAND GOALS

- Identify, protect and maintain important agriculture lands on the island of Hawaii.
- **Preserve the agricultural character of the island.**

FLOOD CONTROL AND DRAINAGE GOALS

- Control pollution.
- Prevent damage from inundation.
- Reduce surface water and sediment runoff

FLOOD CONTROL AND DRAINAGE POLICIES

- [All development] **Development**-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works[.] **and in compliance with all State and Federal laws.**

FLOOD CONTROL AND DRAINAGE STANDARDS

- Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
- Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
- Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code.

NATURAL BEAUTY GOALS

- Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
- Protect scenic vistas and view planes from becoming obstructed.

NATURAL BEAUTY POLICIES

- **Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction during all land use reviews.**
- **Do not allow incompatible construction in areas of natural beauty.**

NATURAL RESOURCES AND SHORELINES GOALS

- Protect and conserve the natural resources of the County of Hawaii from undue exploitation, encroachment and damage.
- Ensure that alterations to existing land forms and vegetation, except crops, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake.

Discussion: The project is consistent with other aspects of the General Plan. It will encourage economic opportunities that are compatible with the County's cultural, natural and social environment, the quality of which will be maintained. Historic sites or agricultural lands will not be adversely impacted. The improvements will be properly sited on the property to avoid encroachment into the flood zone or any other adverse drainage impact. Finally, the natural beauty and natural resources of the Puna area will not be adversely affected directly or indirectly by the proposed project.

1.5.5 DHHL Hawai`i Island Plan

As mentioned in Section 1.1, DHHL's *Hawai`i Island Plan* (DHHL 2002:21) recommends the Maku`u Mauka area for residential homestead, subsistence agriculture, community and cultural uses. The proposed project is necessary to provide for the orderly development of water infrastructure to support the recommended development, and is thus consistent with the plan.

2 ENVIRONMENTAL ASSESSMENT PROCESS

The project involves the use of State of Hawai`i funds and State and County of Hawai`i lands, and therefore requires compliance with Chapter 343, Hawai`i Revised Statutes (HRS), the Hawai`i Environmental Policy Act (HEPA). The State of Hawai`i, Department of Hawaiian Home Lands, (DHHL) is the proposing agency for this Environmental Assessment (EA).

HEPA was enacted by the Hawai`i State Legislature to require State and County agencies to consider the environmental impacts of various actions as part of the decision-making process. Agencies are required to conduct an investigation and evaluation of alternatives as part of the environmental impact analysis process, prior to making decisions that may impact the environment. The implementing regulations for HEPA are contained in Title 11, Chapter 200, *Hawai`i Administrative Rules (HAR).*

This Environmental Assessment (EA) process was conducted in accordance with HEPA. According to HEPA and its implementing regulations, a Draft EA is prepared to document environmental conditions and impacts, to develop mitigation measures that avoid, minimize or compensate for adverse environmental impacts, and determine whether or not an action has significant impacts upon the environment. Impacts are evaluated for significance according to thirteen specific criteria as presented in HAR 11-200-12. If no significant impacts are expected, then a Final EA with a Finding of No Significant Impact (FONSI) may be issued. When the Draft EA determines that significant impacts are present, then a Notice of Intent is prepared and the Final EA facilitates preparation of an Environmental Impact Statement (EIS).

The Draft EA was published in the Environmental Notice of the Office of Environmental Quality Control on February 23, 2004. Six comment letters were received. The letters and the responses to them are reproduced in Appendix 2b. Substantive changes to the EA based upon these comment letters are indicated in the Final EA by text in dotted underline, as in this paragraph.

3 ENVIRONMENTAL SETTING AND IMPACTS

This section describes the existing social, economic, cultural, and environmental conditions surrounding the proposed project along with the probable impacts of the proposed action and mitigation measures designed to reduce or eliminate adverse environmental impacts. For many categories, the No Build Alternative would result in no impacts. Therefore, unless explicitly mentioned, discussion of impacts and mitigation relates to the Build Alternative only.

Basic Geographic Setting

The well and reservoir pad are located at the 824-foot elevation on State of Hawai`i land in the ahupua`a of Maku`u (Figs. 1; 3), on the lower slopes of Kilauea volcano. The access road to the site leads from the end of Kauakahi Place. The cul-de-sac at the end of this road is currently the mauka (southern) limit of those Maku`u Farm and Agricultural lots that have been developed (another increment of lots will be developed mauka of this site in the future, after which time the access road will begin further south). Annual rainfall in the area averages 140 inches, but the terrain is so young that is still lacks streams. The soil in the study area is primarily classified as a histosol, a thin soil that develops on geologically young, yet forested lava (Sato et al. 1973). The area is forested with native `ohi`a (*Metrosideros polymorpha*) trees with a mixture of native and alien invasive low trees, shrubs, herbs, grasses, ferns and mosses. Although alien plant species and feral pigs are common, it is otherwise undisturbed by humans, as the thick brush makes it nearly inaccessible. The area slopes gently upward to the south, with hummocky terrain.

3.1 Physical Environment

3.1.1 Surface Geology, Hazards, and Soils

Existing Environment

The surface geology consists of pahoehoe lava erupted from Kilauea as part of the `Aila`au Flow about 350 years ago. The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. The project site is located in Lava Flow Hazard Zone 3 (on a scale of ascending risk 9 to 1). In Zone 3, approximately 1-5 percent of the land area has been covered by lava flows since 1800, but more than 75 percent has been covered in the last 750 years. As such, there is modest risk of lava inundation over short time scales on the subject property.

In terms of seismic risk, the entire Island of Hawai`i is rated Zone 4 Seismic Probability Rating (Uniform Building Code, Appendix Chapter 25, Section 2518). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built.

In the general vicinity of the project area is Pahoa Cave. Cave experts from the University of Hawai'i at Hilo oriented the environmental assessment team to the cave and provided initial GPS coordinates for skylights, which were later verified in the field. In order to protect the cave, no maps of its location are provided in the EA. This lava tube cave is important in terms of geological value, as well as for historic sites, burials, and rare plant in its skylights. An important consideration in determining a site for the reservoir well/pad and access/utility road was avoidance of the cave. In fact, in consideration of the cave's proximity, the original site selected for these facilities was relocated to the current site. Although the project site is now fairly distant from the cave, in order to ensure that there would be no impacts, archaeologists entered skylights to this lava tube system south of the current study area and explored passages with northerly trends. In addition, the vicinity of the proposed pad and road were carefully inspected for skylights and other evidence of lava tubes by helicopter and on foot. It was determined that no other caves appear to be present in the vicinity of the current proposed location for the facilities.

Impacts and Mitigation Measures

In general, geologic conditions impose no overriding constraints on the project, and no mitigation measures are expected to be required. However, it is recognized the most of the surface of the Big Island is subject to eventual lava inundation, and that all settlements (such as the Maku'u Farm and Agricultural Lots) and infrastructure face some degree of risk.

Special Contract Requirements that will be incorporated into the construction contract documents will stipulate that in case a previously undetected lava tube is breached during construction, DHHL) will implement a contingency plan in coordination with the State Historic Preservation Division:

1. An archaeological monitor is recommended during intitial grading;
2. If a previously undetected lava tube cave is encountered, all construction with the potential to impact the lava tube will immediately cease;
3. The appropriate personnel at DHHL will be contacted;
4. These personnel will contact SHPD and the U.S. Geological Survey, the University of Hawai'i at Hilo, and the U.S. Fish and Wildlife Service to determine whether historic sites or burials are present, and whether the lava tube cave has special geological, biological or other value that merits investigation and data collection; and

Depending on the context and resources associated with the cave, several alternative courses of action may be pursued:

1. If burials or historic sites are present, the mitigation directed by the State Historic Preservation Division and Hawai'i Island Burial Council will be followed, in accordance with Chapter 6E, HRS, Section 106 of the National Historic Preservation Act, P.L. 101-85, and P.L. 101-601.

2. If no historic sites are present, the disposition of the cave will be as follows:
   a. If appropriate and feasible, the cave will be disturbed as little as possible and left as-is.
   b. If the cave poses a structural hazard to the well/reservoir pad or access/utility road or related features, appropriate actions will be taken to produce a structurally sound surface for construction, such as collapse, bridging, structural modification, or some combination of these.

3.1.2 Hydrology

Existing Environment

Hydrogeological Setting

The State Commission on Water Resources Management (CWRM) classification of aquifers locates this part of Puna within the Pahoa Aquifer System of the Kilauea Hydrologic Sector, Code 80801 (Fig. 4). This coding refers to the Hawai'i Island (8), Kilauea Aquifer Sector (08), and Aquifer System (01). The surface boundaries of the aquifer roughly follow the Kilauea-Mauna Loa divide and the East Rift Zone of Kilauea.

The characteristics of this aquifer are determined by the regional geology. Most of the mass of five volcanoes that form the island of Hawai`i is composed of permeable thin-bedded basaltic flows. Hidden beneath the surface of Puna are layers of ash and, in the East Rift Zone, numerous dikes.

Precipitation that is not lost through evapotranspiration or through streams into the ocean percolates into the ground to collect in the aquifers under the island before slowly making its way to the sea. As streams in Hawai`i are generally flashy or even ephemeral, underground water is the most reliable source of water supply, because there is less daily or seasonal change in water tables. Some water is trapped between dikes or perched above confining ash layers as described above, but most water is maintained in the basal freshwater lens which "floats" on the salt-water permeated rock below. Due to the difference in densities, for every foot the lens extends above sea level it extends 40 feet below sea level, although the lower areas contain a zone of mixing. Basal water tables have inland gradients that can rise as much as four feet per mile in high rainfall areas.

The recharge area for the Pahoa Aquifer System is assumed to consist of essentially the surface area contained within the boundaries of the aquifer system. The extent of contribution from or leakage into adjacent aquifer systems is not known. Within the Pahoa Aquifer System, median annual rainfall ranges from about 75 inches at Cape Kumukahi to 190 inches near Mountain View. This high rainfall produces about 994 million gallons per day (mgd) in groundwater

recharge. Groundwater flux in the area is of the order of 50 mgd per mile width along the Pahoa-Kea'au Highway. Consequently, abundant groundwater resources are available in the basal aquifer, and well fields with pump capacities of 5 mgd or more probably can be developed (Hawai'i State CWRM: 1990).

Current Estimated Sustainable Yield, Installed Capacity and Water Use

The sustainable yield of the Pahoa Aquifer System (80801) is estimated at 435 mgd (Source: CWRM).

CWRM maintains a database of wells that provides information on, among other aspects, the aquifer identity, user identity, installed capacity, chloride content, and function. The database does not provide information on current pumpage, which instead is logged in a separate database and is derived from reports from individual well operators. Because not all well operators report their use in a timely manner, pumpage data are often not complete or up to date. Because of security concerns after September 11, 2001, these databases are no longer accessible to the public and data must be requested from CWRM. The database has a register of eleven wells within the Pahoa Aquifer, only five of which are significantly active, as shown in Table 3-1.

Table 3-1
Water Wells in Pahoa Aquifer

Well Number	Well Name	Well Owner	Installed Capacity (gpm)
2986-01	Pahoa Battery 2a	County DWS	250
2986-02	Pahoa Battery 2b	County DWS	350
3185-01	Hawn Shores 1	Hawaiian Beaches	250
3185-02	Hawn Shores 2	Hawaiian Shores	500
3188-01	Keonepoko Nui 1	County DWS	700
No database#	Keonepoko Nui 2	County DWS	700
Wells not in use below			
3081-01	Kapoho Airstrip	County DWS	
3081-02	Puna Thermal	Hwn Thermal	
3206-01	Mt. View TH 8	nd	
3389-01	Keaau-Pahoa Road	County DWS	
3500-01	Waipahoehoe	County DWS	
3588-01	Hwn Paradise 1	Watamull	

Sources: Pumping capacity from Hawai'i State Commission on Water Resources (CWRM) Well Registry,1998 discussions with Hawaiian Beaches and Miller and Lieb personnel, and discussions with DWS; Nd = no data.

The wells in use have a total capacity of 2,750 gpm. On a pumping schedule of 24-hours a day, 7 days a week, with no down-time, it would be possible to pump as much as 3.96 mgd. In reality, of course, pumps only operate a portion of the time for operational and demand reasons.

CWRM was not able to supply recent pumpage data. The latest full-aquifer pumpage data available for this EA was a study done for Keonepoko 2 well (Hawai'i State DHHL 1998), which has been supplemented by discussions with DWS officials . In 1998, as shown below, the County pumped about 0.450 mgd from its wells and private domestic water suppliers pumped roughly the same.

Well Name and No.	Pumping Capacity (gpm)	1998 Use (mgd)
COUNTY WELLS		
Pahoa 2a (2986-01)	250	0.111
Pahoa 2b (2986-02)	350	0.164
Keonepoko Nui (3188-01)	700	0.173
PRIVATE SYSTEM WELLS		
Hawn Shores (3185-01)	250	0.090
Hawn Shores (3185-02)	500	0.691
Total	2038	1.229

Pumping from this aquifer in 1998 was far less than 1.3 mgd, or 0.3 percent of the sustainable yield. Since that time, the Keoneopoko Nui 2 well was converted from exploratory to production status, as shown in Table 1 above, and additional capacity and pumpage is occurring. Discussion with DWS officials indicates that aside from Keoneopoko Nui 2, no new DWS wells have been brought on line, and that total pumpage for DWS wells does not exceed 0.6 mgd. The use for the private system Hawaiian Shores wells is believed to roughly the same. Altogether, it is very likely that less than 2.0 mgd – *about 0.5 percent of sustainable yield* – is currently being pumped from the Pahoa Aquifer. According to DWS and CWRM officials, no major new wells are planned in the near future, and pumpage is likely to stay at similar levels.

Existing Water Quality

The Hawai'i DWS regularly conducts microbiological analysis and contracts for extensive chemical testing in order to comply with U.S. Environmental Protection Agency (EPA) and Hawai'i State standards. Table 3-2 depicts the contaminants tested for and the frequency of testing.

Table 3-2
Summary of Current Water Quality Monitoring Requirements

CONSTITUENT		
Bacteriological	Distribution system	Monthly; number of samples dependent on population served within distribution system
Carbamate, Nitrate, Metals, Inorganic, THM / HAA5 VOC, SOC8, Glyphosate EDB / DBCP / TCP	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Quarterly.
Asbestos	Source/distribution along AC pipe	First 3-year compliance period of 9-year cycle
Nitrate EDB / DBCP / TCP Metals, SOC8, VOC	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Annually
Lead and copper	Customer taps	For systems that have passed, once every three years. For systems that have failed, then once every six months until system passes, then once every three years thereafter.
Reduced Monitoring for Populations<=3300: Metals / VOC (ALL Groundwater sources; ALL Populations) SOC8, EDB / DBCP / TCP Glyphosate, Carbamate Herbicides	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Once every 3 years (R1/1)
Reduced Monitoring for Populations >3300: SOC8, EDB / DBCP / TCP Glyphosate, Carbamate Herbicides	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Twice every 3 years.
Radionuclides	Source	Once every 5 years.

Source: Hawai'i County Department of Water Supply. SDWB = Hawai'i State Department of Health, Safe Drinking Water Branch.

Annual Water Quality reports from the Pahoa system for the latest full year available, 2002 (see Appendix 4), indicate that the system was compliant with all current State of Hawai'i and U.S. Environmental Protection Agency drinking water standards. Specifically, no violations were recorded for radioactive, inorganic, organic or lead and copper contaminants, with all contaminants far below Maximum Contaminant Levels (MCLs).

Impacts and Mitigation Measures

Hydrologic Impacts

Until the exploratory well is drilled and well testing conducted, the effects on drawdown cannot be precisely known. However, hydrologic studies of this area indicate that individual wells within a well field located in the Keonepoko-Pahoa area can probably be spaced as close as 100 feet apart without any adverse interference between wells. Given the enormous volume of freshwater in this aquifer, the very low rates of pumpage now and in the foreseeable future, and the absence of water wells in the vicinity, there is virtually no chance of adverse effects on any existing wells.

In terms of sustainable aquifer yield, based on current pumpage of far less than 1.0 percent of the 425 mgd sustainable yield of the Pahoa Aquifer and a proposed pumping rate of less than 1.0 mgd, there would be no potential for the proposed well to cause pumpage to approach or exceed the aquifer's sustainable yield.

There is also little potential to affect other wells. It is typical for the cone of depression (the area of the aquifer that experiences a drawdown based on pumping from a well) to extend out no farther than a few hundred feet in the Pahoa Aquifer. As the nearest wells lie nearly two miles away near Highway 130 in Keonepoko, there is virtually no chance for effects.

No adverse cumulative impacts are expected. No other major wells are currently planned in the Pahoa Aquifer, although the number of small, domestic wells may increase. As population in Puna grows, there may be more demand for municipal potable water service, but transmission lines, rather than source, constitute the biggest impediment to establishing municipal water systems for the spread out subdivisions of Puna. As stated in Section 1.4.4, the State of Hawai`i plans to build wells, storage facilities and transmission lines to deliver up to 1.47 mgd of irrigation water to the Mak`uu Farm and Agricultural lots (Hawai`i State CWRM 2003) to meet the needs of agricultural users, sometime during the 2010-2020 period. However, considering the current scale of usage and projected future usage, it is unlikely that significant withdrawals relative to the aquifer's estimated sustainable yield would occur even if a number of new wells are brought on line. In any case, as each well is developed, analysis of the installed capacity, sustainable yield of the aquifer, and hydrologic impacts will be undertaken in accordance with requirements of the State Commission of Water Resources Management. The long-term records

of salinity, pumpage and water levels that will be maintained by DWS will assist in protecting the long-term sustainability of the aquifer.

Water Quality

The area near the proposed well appears to be free of any major source of contaminants. No roads or properties currently used for agriculture are present within one mile. The area within a mile on all sides, and within several miles upslope, appears never to have been used for any modern agriculture or developed use.

The Underground Injection Control (UIC) line in the area makai of Pahoa is located at the coast (Fig. 5). The well site and its recharge area are thus mauka of the UIC line, where underlying aquifers are considered drinking water sources and injection wells may be prohibited and are subject to stringent permit requirements.

Considering the depth of the well and the lack of past or current potential sources of contamination, good water quality is expected. Water quality data from the exploratory well will be tested by a qualified laboratory. If testing indicates that the water quality meets the potable water source requirements of the Hawai'i State Department of Health, which tests for a variety of organic and volatile compounds and total and fecal coliform, among other parameters, then the well will be considered suitable for incorporation in the DWS water system.

In this setting, water quality will likely remain high, and no mitigation measures other than standard periodic testing are required.

3.1.3 Floodplains and Surface Water Quality

Existing Environment

Floodplain status for the area near the proposed well, reservoir and access road site is designated Zone X, or Special Flood Hazard areas identified in the community flood insurance study as areas of moderate or minimal hazard from the principal source of flood in the area. The area is recent lava and is generally well drained, although small boggy pockets dot the landscape.

Impacts and Mitigation Measures

The project will add very minimally to the area of impermeable surface and will not adversely affect drainage. In any project, uncontrolled excess sediment from soil erosion during and after excavation and construction has the potential to impact natural watercourses, water quality and flooding potential. Contaminants associated with heavy equipment and other sources during construction have the potential to impact ground water if not mitigated effectively.

Provisions will be made during the construction grading and earthwork to minimize the potential for soil erosion and off-site sediment transport. A Pollution Control Plan and a Stormwater Pollution Prevention Plan will be implemented to ensure that the proposed improvements do not cause drainage or water quality impacts. Best Management Practices (BMPs) such as standard soil erosion and sediment control shall be implemented. These may include measures such as the following:

- Limiting the amount of surface area graded at any given time to reduce the area subject to potential erosion;
- Utilizing soil erosion protective materials such as mulch or geotextiles on areas where soils have a high potential for erosion until permanent provisions such as lawns and grasses can be developed;
- Planting vegetation as soon as grading operations permit to minimize the amount of time soils are exposed to possible erosion; and
- Building sedimentation basins to collect sediment which enters runoff waters.

The project will be regulated through review, revision and approval by the Hawai'i County Department of Public Works (DPW) to ensure compliance with standards related to storm runoff containment.

3.1.4 Climate and Air Quality

Existing Environment

The climate of lowland Puna can be described as mild and moist due to its location in the lowlands on the windward side of the island. Average annual rainfall in the area is 140 inches, with a moderate winter maximum. Winds are generally trades from the east-northeast, which are occasionally replaced by light and variable southerly "kona" winds, most often in winter (UH-Manoa, Dept. of Geography 1998).

Air pollution in the the Pahoa area is minimal, and is mainly derived from volcanic emissions of sulfur dioxide, which convert into particulate sulfate and produce a volcanic haze (vog) that occasionally blankets the district. The persistent tradewinds keep this area relatively free of vog for most of the year.

Impacts and Mitigation Measures

The proposed project will not produce any permanent substantial air quality impacts. Construction has the potential to produce very localized and temporary fugitive dust emissions, although the moist, highly vegetated landscape is not prone to production of dust. There are no dust-sensitive land uses within several miles. Nevertheless, a dust control plan will be

implemented for construction activities with potential to generate substantial dust. The elements of the plan may include some or all of the following:

- Watering of active work areas;
- Cleaning adjacent paved roads affected by construction;
- Covering of open-bodied trucks carrying soil or rock;
- Limiting area to be disturbed at any given time;
- Mulching or stabilizing disturbed inactive areas with geotextile; and
- Paving and landscaping of project areas as soon as practical in the construction schedule.

3.1.5 Noise and Scenic Value

Existing Environment

Noise levels on the site are very low and are derived mainly from the reservoir pump and adjacent residences and roadways. Sensitive noise receptors are present in the form of residences that are adjacent to the existing reservoir site.

The well site is between the existing reservoir and a dirt embankment, surrounded by ironwood trees, and lacks scenic value.

Impacts and Mitigation Measures

Construction will elevate noise levels during short periods over the course of several months. The Department of Health (DOH) will be consulted, and if appropriate, the contractor will be required to obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH would review the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers.

As far as permanent impacts, the distance of the well from any sensitive uses will avoid any impacts from the minor noise produced by the pump. Engineers may select a submersible pump, which would be located within the well, over 800 feet below the ground surface, and thus barely audible on the site. A fan located within the control building will also generate a very small amount of noise. The control building will also be equipped with a visible and audible alarm that is triggered during emergencies. Given that the well is several miles from any noise-sensitive uses, there is little potential for ongoing noise impacts from any source.

Aside from the entrance gate on the access road at the mauka border of the DHHL Maku`u lots, the facilities would be barely visible from any adjacent sites, owing to the gently rolling terrain and the distance to any private land or public viewpoints. The maximum height of structures will

likely be less than 15 feet (see Fig. 2b), and structures will not protrude into views of the coast or nearby roads. Power poles and lines will be visible for the inhabitants of the most mauka DHHL lots, but because of the terrain and the presence of many low trees, will not be visually intrusive for any viewers.

3.1.6 Hazardous Substances

Existing Environment

No known hazardous substances are present near the proposed well and reservoir site. As discussed in Section 3.1.2, the area near the proposed well appears to be free of any major source of contaminants. No roads or properties currently used for agriculture are present within one mile. The area within a mile on all sides, and within several miles upslope, appears never to have been used for any modern agriculture or developed use.

Impacts and Mitigation Measures

Water purification will involve disinfection with chlorine gas, which will be stored in cylinders within a fire-rated enclosure in the control building. Chlorine is a hazardous substance that is inventoried through a Tier-2 Reporting Form, and this information is filed with State and County Civil Defense Agencies and the County Fire Department. In order to ensure proper storage, use and monitoring of this substance, the project will be designed in accordance with the "Water System Standards, Department of Water Supply, County of Hawaii, 2002". The design will be coordinated with the appropriate County and State agencies.

Given the proper design and appropriate agency coordination, as well as the extensive safety precautions for use of the chlorine, there will be negligible hazard to the public or the natural environment.

3.2 Biological Environment

Methods

The proposed road corridor and reservoir site were surveyed for plants by a botanist and ornithologist on October 12, 2003. Plant species were identified in the field and, as necessary, keyed out in the lab. Special attention was given to the possible presence of any federally (USFWS 2000) listed endangered plant species such as *Cyanea platyphylla* or *Cyrtandra giffardii*, both of which have been reported from the lower Puna district. Bird species were identified by sight and sound. No invertebrate survey was conducted. Data from a previous, broader study of the Maku'u Hawaiian Home Lands were also consulted (TNC 1993).

Existing Flora, Impacts and Mitigation Measures

There were ~~13~~ 19 endemic Hawaiian plant species out of ~~27~~ 34 total species identified from the project area (Table 3-3), including those identified during an independent botanical survey of the project area noted in undated letter from David Paul (see Appendix 2b). The vegetation of the entire area can best be classified as Lowland Wet `Ohi`a/Uluhe Fern Forest (Gagne and Cuddihy 1990). `Ohi`a trees (*Metrosideros polymorpha*) were abundant but generally small (5-20 cm diameter at breast height) and sparsely distributed among patches of native uluhe (*Dicranopteris linearis*) fern and introduced broomsedge (*Andropogon virginicus*). The introduced *Melastoma candidum* was a common shrub throughout the entire study site. Although evidence of direct human disturbance is lacking, fires and historic cattle grazing probably caused a decrease in native plant diversity and an increase in the number and prevalence of weed species. No endangered species as listed by the U.S. Fish and Wildlife Service were present on the parcel. *Scaevola kilaueae*, or naupaka kuahiwi, which is classified as a Species of Concern by the U.S. Fish and Wildlife Service (see letter from this agency in Appendix 2b) is present in the road corridor and a number of other locations in the area. Several populations of iliahi or sandalwood (*Santalum paniculatum*) were identified and mapped adjacent to the proposed road corridor.

No adverse effect to threatened or endangered species or effects to ecosystems is likely to occur. Despite being highly overrun with invasive species, the State of Hawai`i land mauka of the Maku`u DHHL parcel represents one of the undeveloped pieces of the `Ai La`au lava flow at this elevation. The following measures are recommended:

- Care should be taken during and after the construction of the road and reservoir/well pad to avoid introduction of any invasive alien species that are not already prevalent in the area. Periodic weed assessment and treatment are recommended.
- The sandalwood patches adjacent to the proposed road corridor should be flagged, and direct or indirect impacts to these patches should avoided to the greatest extent practical during construction.
- DHHL will provide the U.S. Fish and Wildlife Service or their designate the opportunity to remove individuals of *Scaevola kilaueae* from the disturbance corridor prior to grubbing, subject to proper coordination for right-of-entry approval from DLNR and DHHL.

Existing Terrestrial Fauna, Impacts and Mitigation Measures

Few endangered or otherwise rare bird species were observed or would be expected in this lowland area. The Hawai`i `Amakihi (*Hemignathus virens virens*) was the only native bird detected during the survey, and was encountered approximately 200 yards south of the road corridor within a small kipuka.

The vegetation consists of low trees, generally less than 20 feet tall, and no large trees appropriate for nesting by endangered Hawaiian Hawks (*Buteo solitarius*) are present on the access road/reservoir site or would be affected by project activities. As little is known about the roosting sites of the endangered

Table 3-3 Plant Species on Project Site

Scientific Name	Family	Common Name	Life Form	Status*
Andropogon virginicus	Poaceae	Broomsedge	grass	A
Arundina graminifolia	Orchidaceae	Bamboo orchid	herb	A
Bothriochloa pertusa	Poaceae	Pitted beard grass	grass	A
Cibotium glaucum	Dicksoniaceae	Hapu'u fern	fern	E
Clidemia hirta	Melastomaceae	Koster's curse	shrub	A
Cocculus trilobus	Menispermaceae	Huehue	vine	I
Desmodium incanum	Fabaceae	Spanish clover	herb	A
Dicranopteris linearis	Gleicheniaceae	Uluhe	fern	I
Fimbristylis dichotoma	Cyperaceae	Fimbristylis	sedge	I
Lycopodiella cernua	Lycopodiaceae	Club moss	fern ally	I
Machaerina angustifolia	Cyperaceae	'Uki	sedge	I
Machaerina mariscoides	Cyperaceae	'Uki	sedge	I
Melaleuca quinquenervia	Myrtaceae	Paperbark	tree	A
Melastoma candidum	Melastomaceae	Melastoma	shrub	A
Metrosideros polymorpha	Myrtaceae	'Ohi'a	tree	E
Mimosa pudica	Fabaceae	Sensitive plant	herb	A
Nephrolepis cordifolia x multiflora	Nephrolepidaceae	Sword fern	fern	E
Ophioderma pendulum	Ophioglossaceae	Puapuamoa	fern	I
Paraserianthes falcataria	Fabaceae	Albizia	tree	A
Pluchea symphytifolia	Asteraceae	Sourbush	shrub	A
Psidium cattleianum	Myrtaceae	Strawberry guava	tree	A
Psilotum nudum	Psilotaceae	Moa	Herb	I
Pteris cretica		Cretan brake	fern	I
Rhyncospora caduca	Cyperaceae	Beak-rush	sedge	A
Santalum paniculatum	Santalaceae	Iliahi (Sandalwood)	tree	E
Scaevola chamissoniana	Goodeniaceae	Naupaka kuahiwi	shrub	E
Scaevola kilaueae	Goodeniaceae	Naupaka kuahiwi	shrub	E
Scleria testacea	Cyperaceae	Nutgrass	sedge	I
Spathoglottis plicata	Orchidaceae	Philip. ground orchid	herb	A
Sphenomeris chinensis	Lindsaeaceae	Pala'a	fern	I
Stachytarpheta sp.	Verbenaceae	Vervain	herb	A
Waltheria indica	Sterculiaceae	Ahualoa	herb	I
Vaccinium reticulatum	Ericaceae	Ohelo	Shrub	E
Xyris complanata	Xyridaceae	Yellow-eyed grass	sedge	A

E = Endemic species, I = Indigenous species, A = Alien species
Nomenclature used for plants follows *Manual of the Flowering Plants of Hawaii* (Wagner et al. 1990).
Nomenclature for ferns and fern allies follows Palmer (2003).

Hawaiian Hoary Bats (*Lasiurus cinereus semotus*), which is often found in alien as well as native vegetation in a variety of locations throughout the island of Hawai'i, it is unknown if this species is present. Data from The Nature Conservancy (TNC 1993) indicate that bats are probably present in the general area near State Highway 130. Both hawks and bats may forage in the area, but would be unlikely to be impacted by any project activities. Similarly, certain native seabirds fly over the site, but it is unlikely that any with threatened or endangered status would find the site suitable habitat or be affected by activities that occur on the parcel. In order to avoid impacts to threatened or endangered seabirds, the

DHHL will commit to avoid night work on the project, which may attract and confuse several listed bird species.

Existing Aquatic Environment, Impacts and Mitigation Measures

No streams or lakes ~~or wetlands~~ are present or would be affected in any way by surface activities or aquifer pumping. Despite the extremely great flux of fresh groundwater into the coastal waters of Puna, steep bathymetry and rough seas induce almost instantaneous mixing of fresh and salt water. No effects on aquatic biology of coastal waters would be expected from the absence in this flux of the relatively minor quantity of water that would be withdrawn by the well.

*In response to comments on the Draft EA and phone consultation with the U.S. Army Corps of Engineers (COE), additional research was performed concerning wetlands for the Final EA (see letter report attached as Appendix 5, and comment letter from COE in Appendix 2b). Isolated wetlands are present in the project corridor, but none are regulated or protected under Section 404 of the Clean Water Act (see COE comment letter). These features, which have diverse shapes and sizes but often vary from bath-tub to swimming pool size, result from the muck of decaying vegetation plugging up the cracks on recent pahoehoe flows. They are ubiquitous features in the landscape of lower Puna, being present on perhaps the majority of the 25,000+ residential and agricultural lots in the region, and have historically never been subject to regulation during construction activities. They are considered isolated by the U.S. Army Corps of Engineers, which determines whether permits are required for activities that may affect wetlands, because they are not tidal and lack any surface connection to any stream, tributary or ditch. They are dominated by both native and alien species and appear to rarely if ever house rare, threatened or endangered species in lowland environments such as Maku`u. In the corridor area the wetlands vegetation is dominated by the grass broomsedge (*Andropogon virginicus*), the alien sedge beak-rush (*Rhycospora caduca*), the native sedge nutgrass (*Scleria testacea*), and the alien *Xyris complanata*.*

These wetlands have few functions and values that set them apart from the upland matrix in which they are embedded. The apparent lack of important native wetlands obligate species indicates that these ponds are not unique or highly important areas for conservation of native plant species, but their importance in the general landscape ecology should not be dismissed out of hand. It is noteworthy, however, that the plant community of the upland forest matrix – which includes endemic sandalwood and naupaka as well as 'ohi'a and uluhe – is arguably of higher biological function and value than the ponds. It is unknown to what degree these ponds provide habitat for native insects, but the presence of alien predators such as frogs and rats may have severely altered the native insect fauna in this area, as it has in many lowlands. Hydrological functions include flood-storage, erosion control, and filtering of sediment, nutrients, and other pollutants. The small size of the individual ponds and the lack of flood zones in the area mean that actual ponds that would be affected by the proposed project probably

have very modest value in terms of flood protection....The area upgradient of the project area is entirely natural and thus produces no manmade pollution

In general, these ponds appear to have relatively few functions with modest value, and they do not appear to have uniquely different functions from the uplands in the same areas....Importantly, the proposal would convert only a very small percentage of this State parcel to developed uses, and the vast majority of the area would remain as-is, continuing to perform the same functions and values. Considering the context, the project is not expected to result in adverse impacts.

3.3 Socioeconomic

3.3.1 Land Use, Social Factors and Community Identity

Existing Environment

The project site is on State land between Pahoa town and the Ainaloa subdivision, within the State Land Use Agricultural District. The County Zoning is Agricultural, minimum lot size ~~40~~ 20 acres (A-20a). It is designated on the County General Plan Land Use Designation Maps (LUPAG) as *Orchards* (and on the current draft revision as *Proposed Extensive Agriculture*). The site is not within the Special Management Area.

Table 3-4 shows the population and socioeconomic characteristics of both Hawai`i County and the Pahoa-Kalapana area, a region identified by the U.S. Census Bureau as a *Census Designated Place* (CDP). Pahoa-Kalapana comprises all of lower Puna southwest of Hawaiian Paradise Park and Ainaloa, including the project area.

In comparison to the island as a whole, the Pahoa-Kalapana area has a somewhat greater portion of residents born outside the State, and an ethnic makeup that has a greater proportion of both whites and Hawaiians than the County as a whole. It has more children as well as more elderly than the County average, but has a median age that is roughly the same. Pahoa-Kalapana also has lower median incomes, a greater proportion of residents living in poverty, and a greater proportion of adults younger than 64 with a disability (Table 3-4).

Impacts and Mitigation Measures

No relocation of residences, businesses, community facilities, farms or other activities would occur because of the project. The project does not adversely affect kuleana. In the long term, all direct impacts to the social environment may be regarded as beneficial, because it improves the quality, quantity, and reliability of potable water for residences and businesses. All water projects require consideration for the secondary effects of growth induction; this topic is covered in Section 3.4.

Table 3-4
Selected Socioeconomic Characteristics

CHARACTERISTIC	Hawai`i Island	Pahoa-Kalapana CCD
Total Population	148,677	8,597
Percent White	31.5	38.0
Percent Asian	26.7	17.2
Percent Hawaiian	9.7	11.4
Percent Two or More Races	28.4	28.4
Median Age (Years)	38.6	38.0
Percent Under 18 Years	26.1	28.8
Percent Over 65 Years	13.5	13.8
Percent Households with Children	37.5	32.4
Average Household Size	2.75	2.76
Percent Graduated High School	84.6	82.3
Percent 19 to 64 Years with Disability	19.2	27.7
Percent Born in State of Hawai`i	63.3	55.8
Percent Housing Vacant	15.5	16.1
Percent Over Age 16 in Labor Force	61.7	56.3
Median Household Income	$39,805	$27,920
Percent Below Poverty Level	15.7	27.3

Source: U.S. Bureau of the Census. May 2001. *Profiles of General Demographic Characteristics, 2000 Census of Population and Housing, Hawai`i.* (U.S. Census Bureau Web Page).

3.3.2 Public Services, Facilities and Utilities

Utilities

The well and supporting facilities will require electrical power. This will be provided via overhead lines that will use the road easement. The power demands of the well pump, control building and reservoir will be relatively small, and no adverse affect to the utility will occur.

Roadways

Access to all sites for construction and maintenance will be via a new, gated roadway at the end of Kauakahi Street. The road will be 10 feet wide, paved with asphalt concrete over base course, with an additional 10-foot easement for the electrical power lines (see Fig. 2c). Access to State Highway 130 will occur via the internal road network of the Maku`u DHHL subdivision. Construction vehicles will turn off Highway 130 at Ni`aulani Street, which has left-turn lanes in

both directions. Very few trips will be necessary for maintenance of the facility, and there will be no adverse impacts to public roads.

Police, Fire, Emergency Medical, Recreation, Schools, and other Public Facilities and Services

All such facilities and services are present in the Puna District. No such facilities or services would be affected in any adverse way.

3.3.3 Cultural and Historic Resources

An archaeological and cultural study of the proposed well/reservoir site and the access/utility road area was conducted by Rechtman Consulting, Inc. It is attached as Appendix 3 and summarized in this and the next section.

With respect to possible historic and cultural properties, the area of potential effects (APE) for this study is the footprint of the water well/reservoir and the pipeline and access road. The purpose of the study was to document the presence of any historic properties or traditional cultural properties that might exist within the project area, to assess the significance of any such resources, and to provide a statement of impact to any such resources as a result of the proposed construction of the wastewater facility. The study used a variety of archaeological and historical reports as well as consultation with informants. This information provided a context for the search for potential historic or traditional cultural properties.

3.3.3.1 Cultural Setting

Existing Environment

The *ahupua'a* of Hālona, Pōpōkī, and Maku'u, where the reservoir/well pad and access/utility road are located, are portions of the larger Puna District, one of six major districts on the island that remain intact today. This division of districts (and likely all of the smaller land divisions) extends back in time to at least A.D. 1475, in the time of the Chief Līloa. The district were brought together under a single ruler when 'Umi a Līloa (son of Līloa) came to power in about A.D. 1525 (Maly 1999). Barrère (1959) summarized the Precontact geopolitics of the Puna District as follows:

> Puna, as a political unit, played an insignificant part in shaping the course of history of Hawaii Island. Unlike the other districts of Hawaii, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Ka`u and Hilo. (Barrère 1959:15)

The entire district of Puna has always been dominated by the activities of Kilauea Volcano. A great lava flow covered much of this part of Puna, including the project area, in the era prior to Western contact. Termed by geologists the 'Aila'au flow, it occurred 260-450 years before the present (Holcomb 1987). There appears to be no specific legend concerning the flow that has survived to the present, but based on specific ethnographic analogy (with historic lava flows in Kona and Ka'ū) it is likely that this flow was a storied event with cosmologic and mythical associations.

The Puna District generally remained under the control of outside chiefs until the time of Kalani'ōpu'u's reign in the 18th century. Shortly before his death in 1782, Kalani'ōpu'u's dominion over Puna and portion of Ka'ū was challenged by the Puna chief 'Īmakakōloa. Kalani'ōpu'u resolved the unrest, but following his death the disposition of Puna once again became an issue until Kamehameha I successfully brought the entire island under his control in 1793.

The Lower Puna area, well-populated by Hawaiians before 1800, was nearly abandoned in the 19th century. Cattle raising and agriculture dominated land use in Puna in the late 1800s (*Puna Community Development Plan Technical Report*, by Community Management Associates 1992:10). Despite such economic ventures, the population in Puna remained the lowest of any district on the island, reaching a nadir of 834 in 1890 (Ibid.:10). The advent of plantation sugar in Puna in about 1900 brought with it villages of immigrant laborers, and Puna's population began to slowly grow. Growth has accelerated since 1970 as a result of the creation and occupancy of tens of thousands of residential agricultural lots in substandard subdivisions. The low costs and relaxed standards have drawn thousands of residents, including retirees, commuters to Hilo, and individuals and families relying on transfer payments for income. Many native Hawaiians have come to occupy the variety of communities that make up Puna and have thus spurred an interest in the perpetuation and revival of cultural practices.

In general, the mid-elevation parts of Puna possess a variety of floral and lithic resources that have documented cultural uses, primarily the gathering of plants for medicinal and ceremonial purposes (Burtchard and Mobolo 1994; Holmes 1985; Maly 1992, 1999). The continuation of traditional gathering practices in Puna has often been asserted as part of the community response to the geothermal development in the region.

Consultation

As part of the current study, the Office of Hawaiian Affairs (Ululani Sherlock), the Maku'u Farmers Association (Paula Kekahuna along with several other members), and Kepā Maly (Kumu Pono Associates) were contacted in an effort to obtain information about any potential traditional cultural properties that might be present in upper Maku'u, Hālona, and Pōpōkī *ahupua'a*.

When asked concerning the specific project area, none of the organizations/individuals contacted had any information relative to the existence of traditional cultural properties in the immediate vicinity of the current project area; nor did they provide any information indicating current use of the area for traditional and customary practices.

Impacts and Mitigation Measures

No resources with traditional association of a potential traditional cultural nature (i.e., such as special hills, groves of trees, lava tube openings, etc.) appear to be present on or near the project site. No streams, wetlands, or anchialine pools are fed or affected by the area of the aquifer that would be pumped by the project, and hydrological impacts upon these or any marine resources would be expected. No biological resources (e.g., valuable native or Polynesian gathering plants) are found on the reservoir site or would be expected to be impacted by project activities. Finally, as the project is basically intended to supplement the water supply of the Maku`u DHHL lots, any secondary impacts to cultural resources that might result from induced growth have been factored in by DHHL planners. In that the water system fulfills requirements that will enable more beneficiaries of the Hawaiian Home Lands trusts to settle the land in Maku`u, it will enable the reinstitution of cultural ties to the land and may have a beneficial cultural effect.

In conclusion, no cultural features are present and none are likely to be impacted by the proposed project. The Draft EA has been distributed to groups knowledgeable in the area's resources to ensure that this conclusion is valid.

3.3.3.2 Archaeological Resources

Environmental Setting

There has been a number of archaeological, cultural, and historical studies of the area. These are cited and discussed in Appendix 3. Most notable is McEldowney (1979), which presented an archaeological and historical literature review and research design for the south Hilo and Puna areas. This study, based on ethnohistorical and early historical observations and descriptions of the region, and supported by several subsequent archaeological studies, can be used as a general predictive model for archaeological site distributions within the current study area.

Only five studies were conducted in inland areas comparable to the current study area. Aside from the extensive lava tube systems documented in two of these studies (and avoided by the proposed project) (McEldowney and Stone 1991; Yent 1983), only three other features were recorded in over 2,000 acres of total survey area (Bordner 1977; Conte and Kolb 1994; Franklin et al. 1992). One of these features was an *ahu*, or cairn (Bordner 1977); and the other two were small terraces interpreted as agricultural planting areas (Franklin et al. 1994). This lack of archaeological features is understandable, considering that most of the area is on a relatively young lava flow.

The soil in the study area is primarily classified as a histosol, a thin soil that develops on geologically young, yet forested lava. Starting around 1,000 feet elevation (just above the study area) there are also limited pockets of more developed soils of the Kekake-Keei-Kiloa series and Haipoe-Maile-Puu Oo series (Sato et al. 1973). These are thin rocky soils that overlay the 'Aila'au flow.

Historical Context

As a result of the *Māhele* of A.D 1848, Maku'u, Hālona, and Pōpōkī *ahupua'a* were retained as government land. Large coastal portions of these land units were later commuted as grants, while the *mauka* lands have since remained idle. By the 1890s the government was investigating ways to improve access and resources in Puna. In 1892 a surveyor named Loebenstein was directed to survey a new inland road (roughly in the location of the current Highway 130) through the district. In a newspaper interview, he describes the area as follows:

> The arable belt of Puna is from three to six miles from the sea coast, and is consequently unexplored. It is a wonderful country and I could talk of it by the hour. It only lies in the hands of the Government to develop it. Everything depends on an appropriation being made for the road, of which the preliminary survey has been made.. . . The road begins at the edge of the Ramie camp, one mile from the edge of the woods–nine miles from Hilo. It follows the old road for a mile and a half more, and is to extend to Kaimu on a new survey . . . I met with ancient trails showing traces of a dense population and cultivation in early times. The road, if opened, will afford beautiful scenery to tourists, as there are natural wonders all along, lava trees, pit craters and lava tunnels extending for miles which formed ancient burial places. There are natural benches formed by the lava, where the dead were placed, and on these are the bones, skulls and sometime complete skeletons. These tunnels are from 25 to 30 feet wide and about the same in height, and of course pitch dark . . . From the ninth to the nineteenth mile [the current study area is at about the ninth mile] the road is over *pahoehoe*, the arable land lying about a mile and a half above . . . There is considerable sandal wood growing on the *pahoehoe*, but the ranchers are too indolent to drive cattle, so they make fires and burn off the brush, which kills the sandal wood. It is a shame. There are no wild cattle in Puna . . . (Hawaiian Gazette, March 22, 1892)

A Hawai`i Territorial Survey map (Register Map 2268) dated 1903 shows a *mauka/makai* trail extending inland from the shore along the Hālona/Pōpōkī boundary. It is unclear how far inland this trail may have gone, but it is possible that it provided coastal residents access to the more fertile (soil covered) lands *mauka* (above 1,000 feet elevation) of the current study area.

Based solely on elevation, the current project area falls within the Upland Agricultural Zone (Zone II) as defined by McEldowney (1979). However, as she indicates, this zone also corresponds with the distribution of ash soils, which do not extend into the current study area. The environmental qualities of the current study area are more akin to McEldowney's (1979) description of the Lower Forest Zone (Zone III). This region is characterized by scattered *'ōhi'a* with an understory of *hapu'u* and *uluhe*. Thus, the archaeological expectations for the general project area are limited to trails, localized agricultural features, ephemeral habitations, and lava tubes containing both habitation debris and burials. While undocumented in the literature, it has been suggested based on oral information (see Franklin et al. 1992:15) that lava tubes also were used as secret places in which chant, hula, and other traditional cultural activities were practiced during the period (1830-1870s) of prohibition on such activities.

This general model can be refined for the specific study area based on the results of prior archaeological investigations, which document that archaeological sites are very scarce. While it is possible that some agricultural and temporary habitation features could be present in the study area, it is more likely that the only sites discoverable would be trails or trail markers and lava tubes (Bordner 1977; Conte and Kolb 1994; Franklin et al. 1992).

Fieldwork

Between October 7–9, 2003, a field crew performed a field survey of the entire project area, the limits of which were marked by surveyors. Prior to the conduct of the field survey, vegetation was cut by hand along the proposed corridor to the well/reservoir site. Vegetation cover over the proposed well/reservoir site ranged from sparse (exposed lava) to dense (thick *uluhe* stands). The entire area was systematically and intensively examined. As part of the current fieldwork, the previously identified Pāhoa Cave was also inspected to see if underground passages might extend into the current study area. The fieldworkers located entrances to this lava tube system south of the current study area and explored passages with northerly trends.

No archaeological resources were observed within the project area; and none of the passages examined within the Pāhoa Cave system extended into the study area. While certain plant species suggestive of past human practices (e.g., *kukui*, *kī*) were observed in the vicinity (but outside of the immediate project area), there was no evidence indicating that the area was currently being accessed for the exercise of traditional and customary practices associated with any traditional cultural properties or resources.

Impacts and Mitigation Measures

The archaeologist concluded, and DLNR-SHPD concurred (see letter of January 20, 2004, in Appendix 2a), that historic properties were present that none would be affected by of implementing the project.

However, in order to avoid impacts in the highly unlikely event that archaeological resources are encountered during land-altering activities associated with construction, the archaeologist has proposed, and DLNR-SHPD has concurred, that an archaeological monitor be present during initial grubbing of the study area. In the event that archaeological resources are encountered during this activity, the on-site monitor can immediately secure and protect the resources and contact DLNR-SHPD, as outlined in Hawai`i Administrative Rules 13§13-280. This recommendation is consistent with the historic sites portion of the general mitigation for inadvertent cave, as outlined in Section 3.1.1, above.

3.3.5 Agricultural Land

Existing Farming Operations and Value of Agricultural Land; Impacts and Mitigation Measures

Consultation of maps of important farmland from the U.S. Natural Resources Conservation Service (USNRCS) (as displayed in the Hawai`i State Geographic Information System) determined that the reservoir property, where the well is located, is not classified as important agricultural lands in *Agricultural Lands of Importance to the State of Hawai`i* (ALISH) map series. No farming is occurring within several miles of the well and reservoir site. Some farming is taking place in the Maku`u DHHL lots, where the access road begins.

No adverse impacts to farmland or farming would occur. The provision of water may benefit farm families and farming in the DHHL Agricultural and Farm Lots.

3.4 Growth-Inducing, Cumulative and Secondary Impacts

Growth-Inducing Impacts

Analysis of growth-inducing impacts examines the potential for a project to induce unplanned development, substantially accelerate planned development, encourage shifts in growth from other areas in the region, or intensify growth beyond the levels anticipated and planned for without the project. Provision of needed infrastructure such as roads, water supply, sewer facilities, etc., is often seen as growth-inducing. Of key importance is whether infrastructure fulfills existing demands/needs of planned growth, or whether it instead enables unplanned growth and/or diverts growth away from planned areas.

The proposed increase to the water supply is in response to a need for additional supply to serve the planned development of the DHHL Maku`u Agricultural and Farm Lots. Water in the system will also be available for planned growth (i.e., as expressed in the Hawai`i County General Plan) within existing service areas. Water is a necessary condition for this planned growth, but it has not acted as a constraining factor. Regarding unplanned growth, it is important to note that when planning for service expansion, DWS has taken a conservative approach in defining service areas, in effect limiting them to areas that have appropriate planning and zoning

approvals in place. As a result, DWS is servicing the orderly development of planned growth, and not inducing unplanned growth or accelerating planned growth.

Cumulative Impacts

Cumulative impacts result when implementation of several projects that individually have minor impacts combine to produce more severe impacts or conflicts among mitigation measures.

All adverse impacts of the current project related to most categories of effect, including hydrology, native species/habitat, regulated wetlands, water quality, erosion, historic sites, and other areas of concern, are either non-existent or extremely restricted in geographic scale, negligible, and capable of mitigation through proper enforcement of permit conditions. No adverse cumulative impacts related to the sustainable yield of the aquifer would occur. There are thus no appreciable adverse impacts that might accumulate with those of other past, present and future actions to produce more severe impacts.

Secondary Impacts

Construction projects may induce secondary physical and social impacts that are only indirectly related to project. For example, construction of a new recreation facility can lead to changes in traffic patterns that produce impacts to noise and air quality for a previously unimpacted neighborhood. In this case, the proposed project's impacts are limited to direct impacts at the site itself, and there does not appear to be any potential for secondary impacts.

3.5 Required Permits and Approvals

Several permits and approvals would be required to implement this project. They are listed here under their granting agencies.

Hawai`i State Department of Land and Natural Resources
1. Approval for Use of State Land

Hawai`i State Commission on Water Resources
1. Well Construction Permit 2. Pump Installation Permit

Hawai`i State Department of Health
1. Preliminary Engineering Report

Hawai`i Planning Department
1. Plan Approval*

* The applicability of County land use law is qualified by the provisions of the *Memorandum of Agreement Between the County of Hawaiian and the Department of Hawaiian Home Lands*, signed in 2002.

4 COMMENTS AND COORDINATION

4.1 Agencies and Organizations Contacted

The following agencies received a letter inviting their participation in the preparation of the Environmental Assessment.

County of Hawai`i

- Planning Department
- Public Works Department
- Department of Water Supply
- County Council

State of Hawai`i

- Department of Land and Natural Resources, Historic Preservation Division
- Department of Land and Natural Resources, Director
- Hawai`i State Commission on Water Resource Management
- Office of Hawaiian Affairs

The following organizations/individuals received a letter and/or personal invitation soliticing its participation in the preparation of the Environmental Assessment:

- Sierra Club
- Dr. Fred Stone, Hawai`i Community College

Copies of correspondence from agencies with substantive comments during the preparation of the EA are included in Appendix 2A and are cited in appropriate sections of the text of this EA.

The Draft EA was distributed to these organizations, as well as the Maku'u Farmers Association, Hui Kako`o Ho`opulapula, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey.

The Draft EA was published in the Environmental Notice of the Office of Environmental Quality Control on February 23, 2004. Six comment letters were received. The letters and the responses to them are reproduced in Appendix 2b. Substantive changes to the EA based upon these comment letters are indicated in the Final EA by text in dotted underline, as in this paragraph.

5 LIST OF DOCUMENT PREPARERS

This Environmental Assessment was prepared for the State of Hawai`i, Department of Hawaiian Home Lands by Ron Terry, Ph.D., of Geometrician Associates, with assistance from ESH, Inc., the engineering contractor for the well project.

6 STATE OF HAWAI'I ENVIRONMENTAL ASSESSMENT FINDINGS

Section 11-200-12 of the State Administrative Rules sets forth the criteria by which the significance of environmental impacts shall be evaluated. The following discussion paraphrases these criteria individually and evaluates the project's relation to each.

1. *The project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No significant natural resources will be irrevocably committed or lost. The State Historic Preservation Division has concurred with the determination that no effect to historic properties will occur.

2. *The project will not curtail the range of beneficial uses of the environment.* No future beneficial use of the environment will be affected in any way by the proposed project. Sufficient water will remain, well within the sustainable yield of the aquifer, to promote other beneficial uses of groundwater in the Pahoa region.

3. *The project will not conflict with the State's long-term environmental policies.* The State's long term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. A number of specific guidelines support these goals. No aspect of the proposed project conflicts with these guidelines. The project's goals of providing potable water to support adequate supply and orderly development of planned growth while conserving natural resources satisfies the State's environmental policies.

4. *The project will not substantially affect the economic or social welfare of the community or State.* The improvements will benefit the social and economic welfare of Hawai`i by improving the potable water supply system.

5. *The project does not substantially affect public health in any detrimental way.* No adverse effects to public health are anticipated. Public health will be benefited by improving the potable water supply system.

6. *The project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* No adverse secondary effects are expected. The project will not enable development, but will instead assure adequate supply to existing customers and serve planned growth.

7. *The project will not involve a substantial degradation of environmental quality.* The implementation of best management practices for all construction will ensure that the project will not degrade environmental quality in any substantial way.

8. *The project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* No endangered species of flora or fauna are known to exist on the project site or would be affected in any way by the project.

9. *The project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* Cumulative impacts result when implementation of several projects that individually have minor impacts combine to produce more severe impacts or conflicts among mitigation measures. All adverse impacts will either not occur or will be reduced to negligible levels through mitigation measures, and will therefore not tend to accumulate in relation to this or other projects.

10. *The project will not detrimentally affect air or water quality or ambient noise levels.* The project will have negligible effects in terms of water quality, air quality and noise.

11. *The project will not affect or will likely be damaged as a result of being located within an environmentally sensitive area such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters.* No floodplains, tsunami zones, geologically hazardous areas, or other such sensitive land is involved in the area planned for development.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No protected viewplanes will be impacted by the project, which will have no adverse scenic effects.

13. *The project will not require substantial energy consumption.* Some, but not substantial, input of energy is required for the construction of the facilities and the operation of the pump.

For the reasons above, and after consideration of comments on the Draft EA, the State of Hawai`i, Department of Hawaiian Home Lands, has determined that the proposed project will not have any significant effect in the context of Chapter 343, Hawai`i Revised Statues and section 11-200-12 of the State Administrative Rules, and has thus issued a Finding of No Significant Impact (FONSI).

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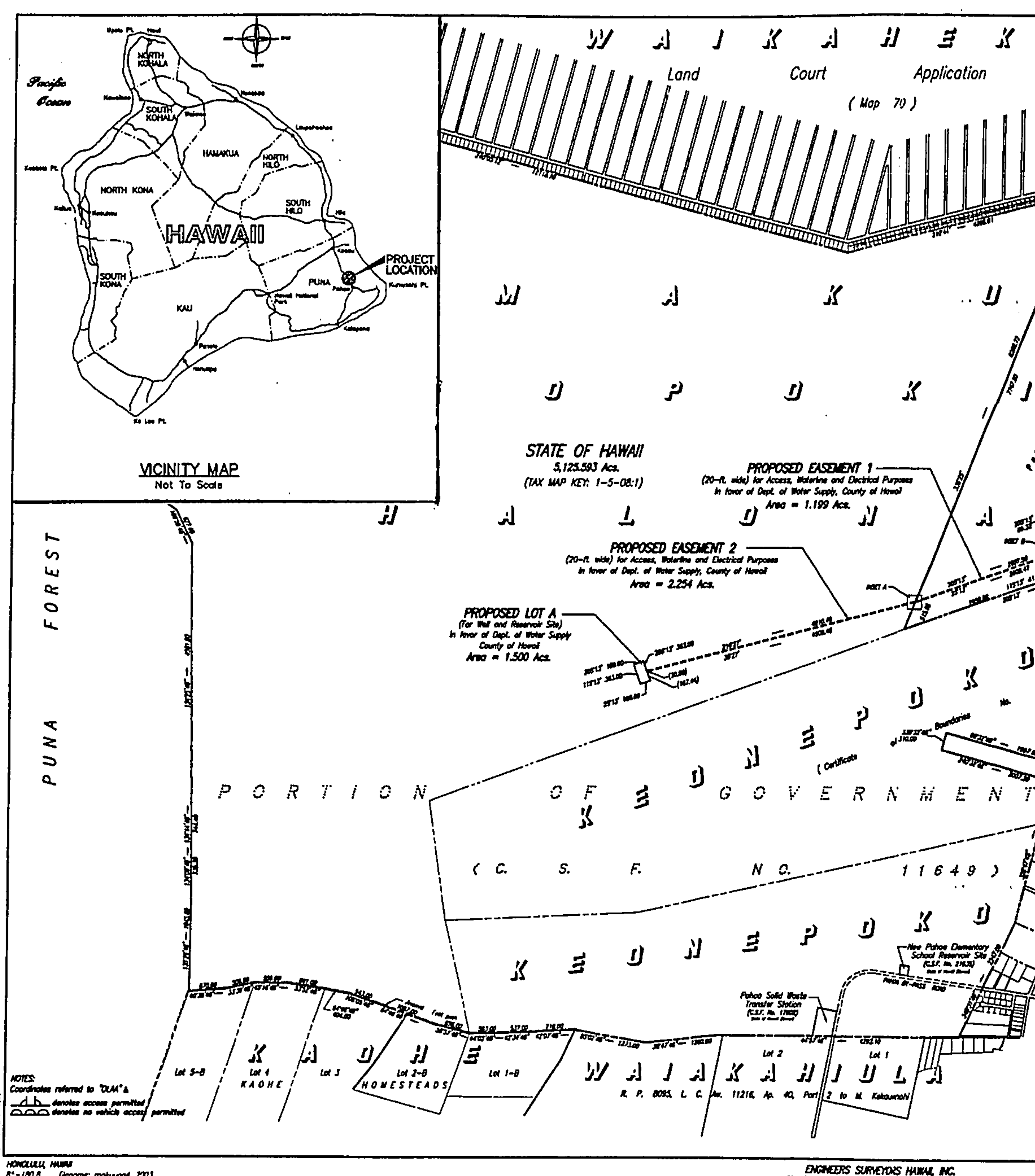
MAKU'U OFFSITE WATER SYSTEM PHASE 2

ENVIRONMENTAL ASSESSMENT

APPENDIX 1

FIGURES


VICINITY MAP
Not To Scale
HAWAII
NORTH KOHALA
SOUTH KOHALA
HAMAKUA
NORTH HILO
SOUTH HILO
NORTH KONA
SOUTH KONA
KAU
PUNA
PROJECT LOCATION
Pacific Ocean
WAIKAHEKAHE
Land Court Application
(Map 70)
MAKUU
OPOOKI
STATE OF HAWAII
5,125.593 Acs.
(TAX MAP KEY: 1-5-08:1)
PROPOSED EASEMENT 1
(20-ft. wide) for Access, Waterline and Electrical Purposes
In favor of Dept. of Water Supply, County of Hawaii
Area = 1.199 Acs.
PROPOSED EASEMENT 2
(20-ft. wide) for Access, Waterline and Electrical Purposes
In favor of Dept. of Water Supply, County of Hawaii
Area = 2.254 Acs.
PROPOSED LOT A
(For Well and Reservoir Site)
In favor of Dept. of Water Supply
County of Hawaii
Area = 1.500 Acs.
HALONA
PUNA FOREST
PORTION OF GOVERNMENT
KEONEPOKO
(C. S. F. NO. 11649)
KEONEPOKO
New Pahoa Elementary School Reservoir Site
Pahoa Solid Waste Transfer Station
Lot 5-B
Lot 4
Lot 3
Lot 2-B
Lot 1-B
Lot 2
Lot 1
KAOHE HOMESTEADS
WAIAKAHIULA
R. P. 8095, L. C. Aw. 11216, Ap. 40, Part 2 to M. Kekaunohi
NOTES:
Coordinates referred to "OLAA"
denotes access permitted
denotes no vehicle access permitted
HONOLULU, HAWAII
ENGINEERS SURVEYORS HAWAII, INC.
Civil Engineers - Surveyors - Construction Managers

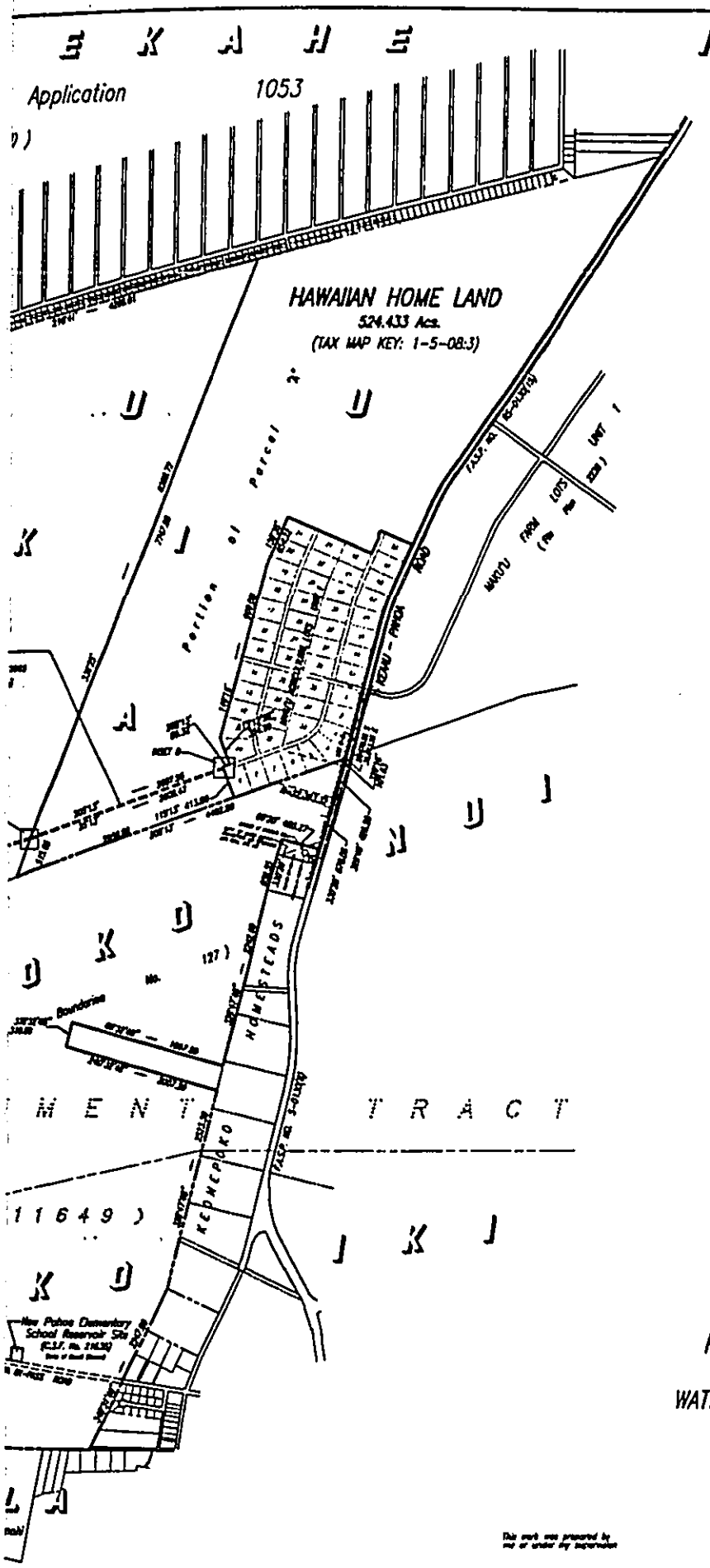
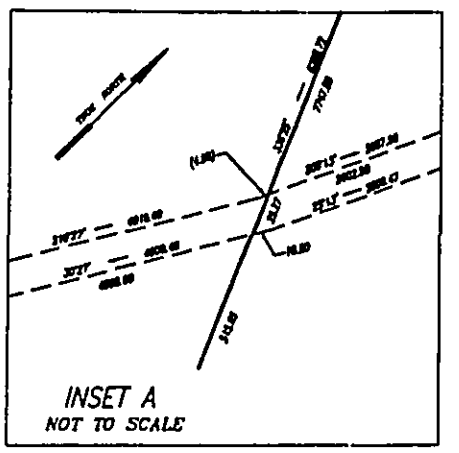
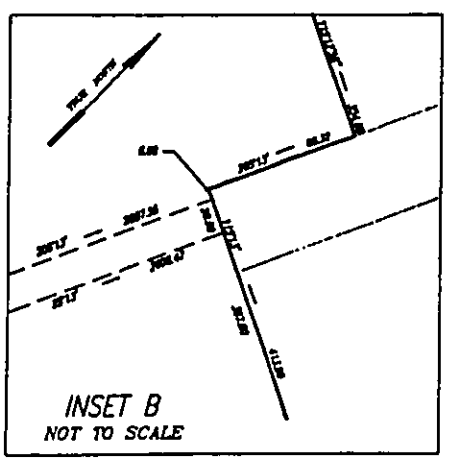


Figure 1

Project Location





PRELIMINARY
PROPOSED LOT A & EASEMENT 1 & 2
FOR WATER WELL AND RESERVOIR,
WATER TRANSMISSION LINE AND ACCESS ROADWAY
OVER AND ACROSS STATE OF HAWAII LAND
AND HAWAIIAN HOME LAND

AT MAKUU, POPOKI, HALONA AND KEONEPOKO
PUNA, ISLAND OF HAWAII, HAWAII

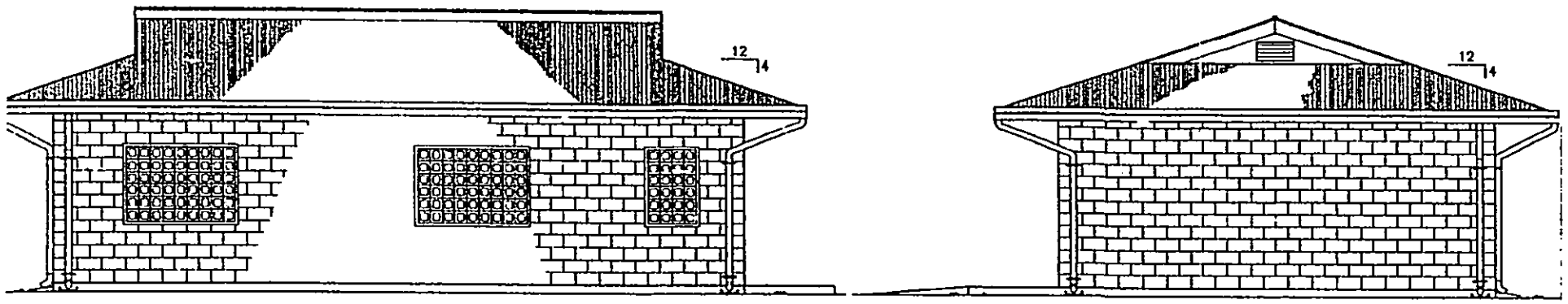
TAX MAP KEY: 3RD. DIV. 1-5-08: 1 & 3
OWNERS: STATE OF HAWAII &
HAWAIIAN HOME LAND

This work was prepared by me or under my supervision

By _____
Miles S. Hara Exp. 4-30-04
Licensed Professional Land Surveyor
Certificate Number 10,007

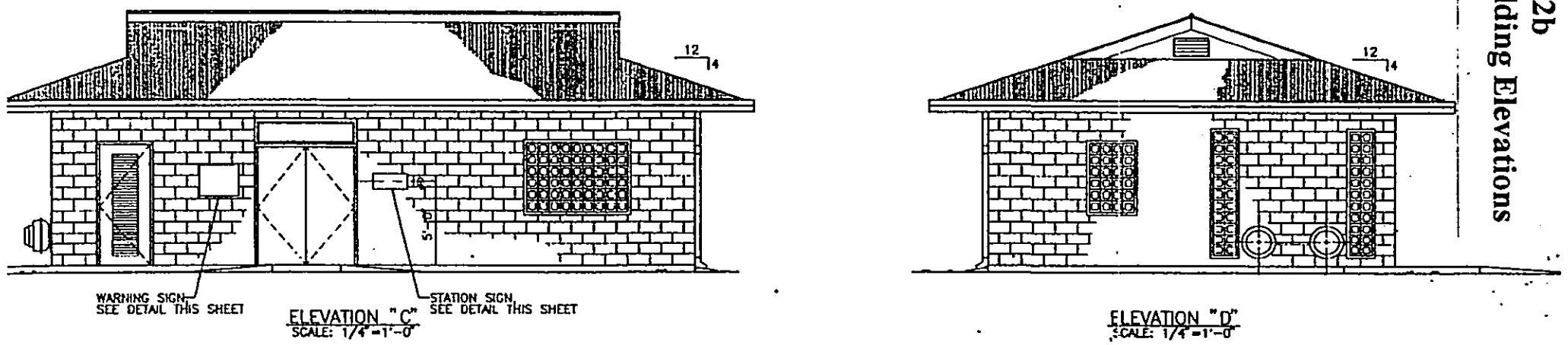
S HUBAL, INC.
Construction Managers

900 HALEKAUWILA ST.
DECEMBER 10, 2003



ELEVATION "A"
SCALE: 1/4"=1'-0"

ELEVATION "B"
SCALE: 1/4"=1'-0"



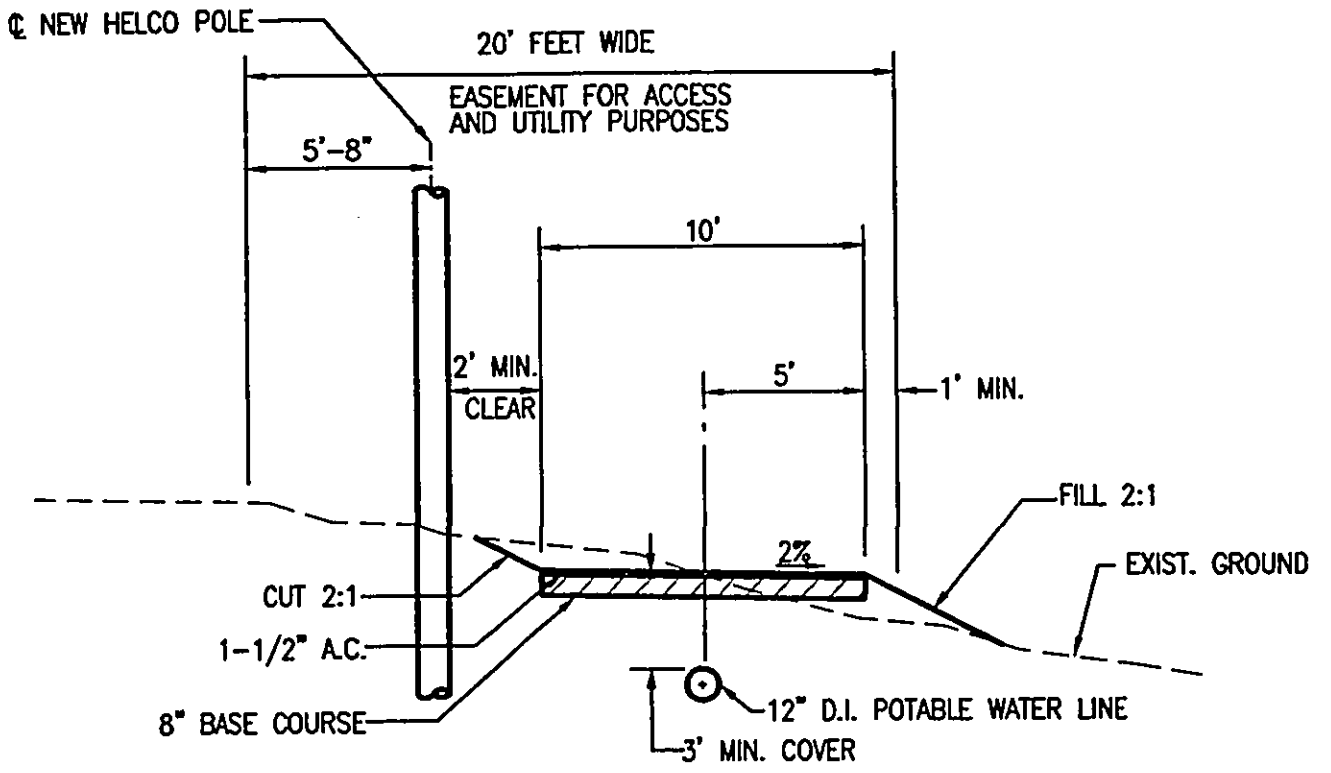
ELEVATION "C"
SCALE: 1/4"=1'-0"

ELEVATION "D"
SCALE: 1/4"=1'-0"

EXTERIOR ELEVATIONS
SCALE: 1/4"=1'-0"

Figure 2b
Typical Control Building Elevations

Figure 2c



TYPICAL SECTION – ACCESS ROAD

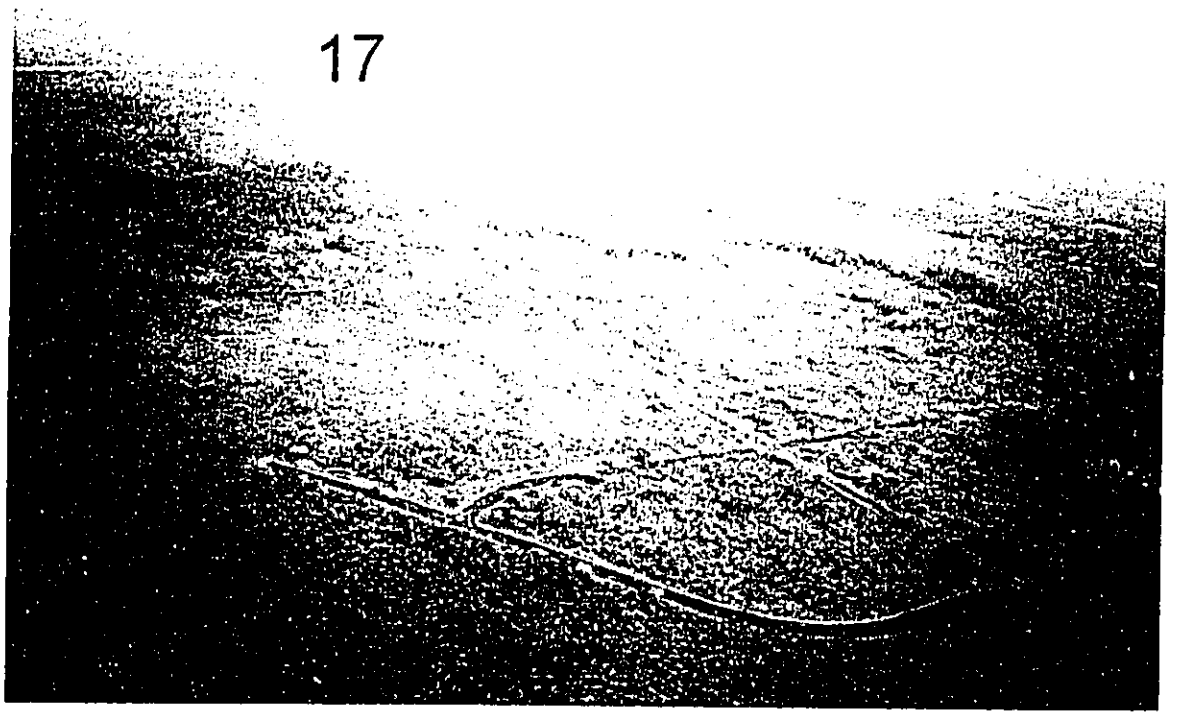
NOT TO SCALE

MAKUU OFFSITE WATER HIGH SERVICE SYSTEM

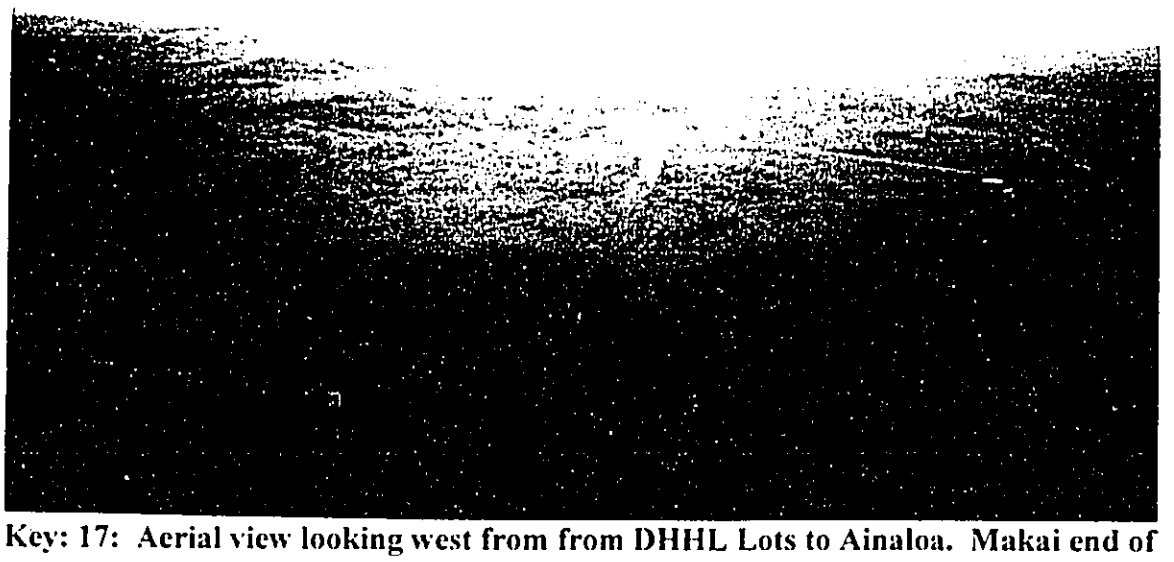
j:85-180.10 f:Makuu Offsite Water (ESH-1) 1=1 12/05/03 HJB

Figure 3
Project Site Photos

17

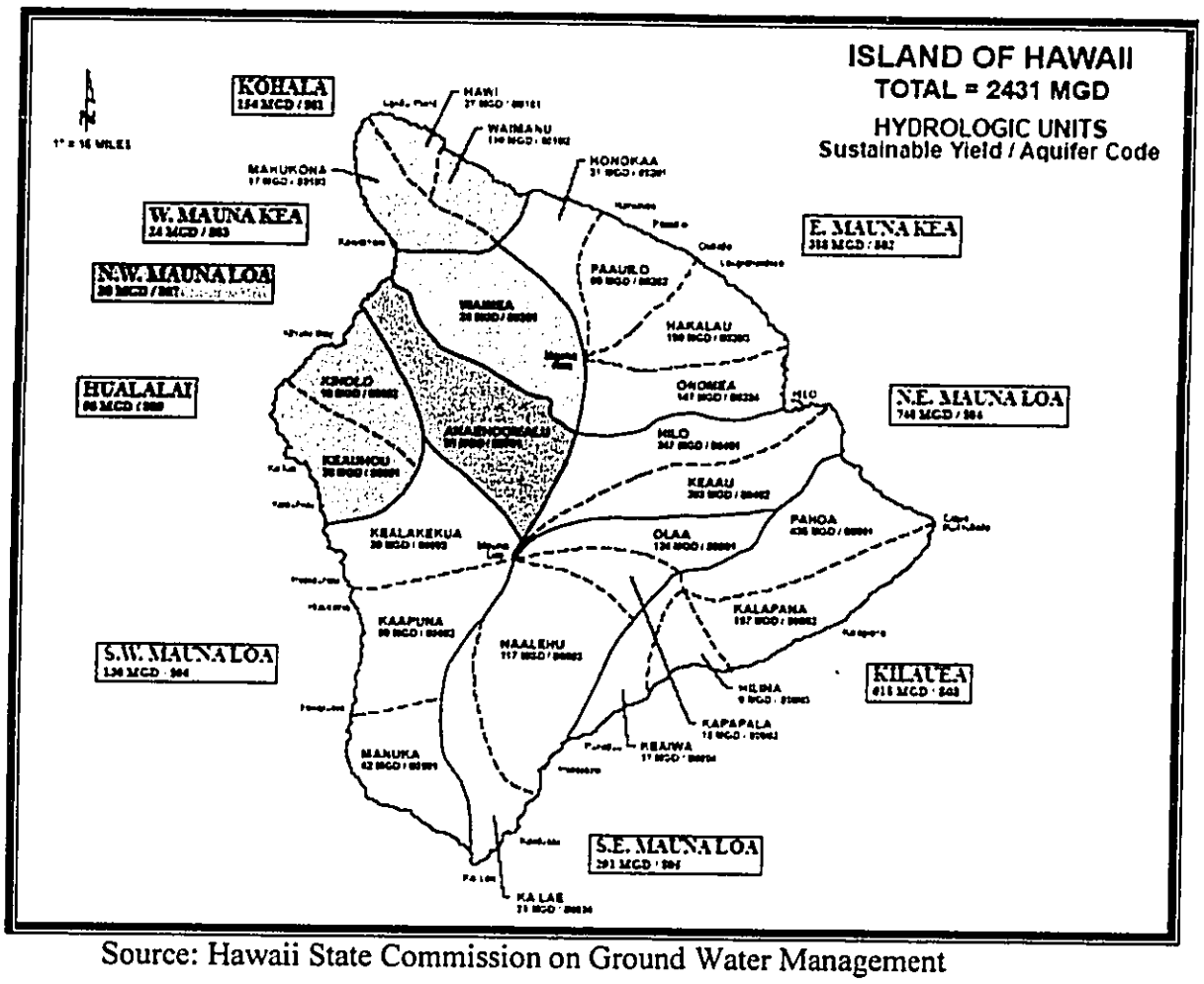


18



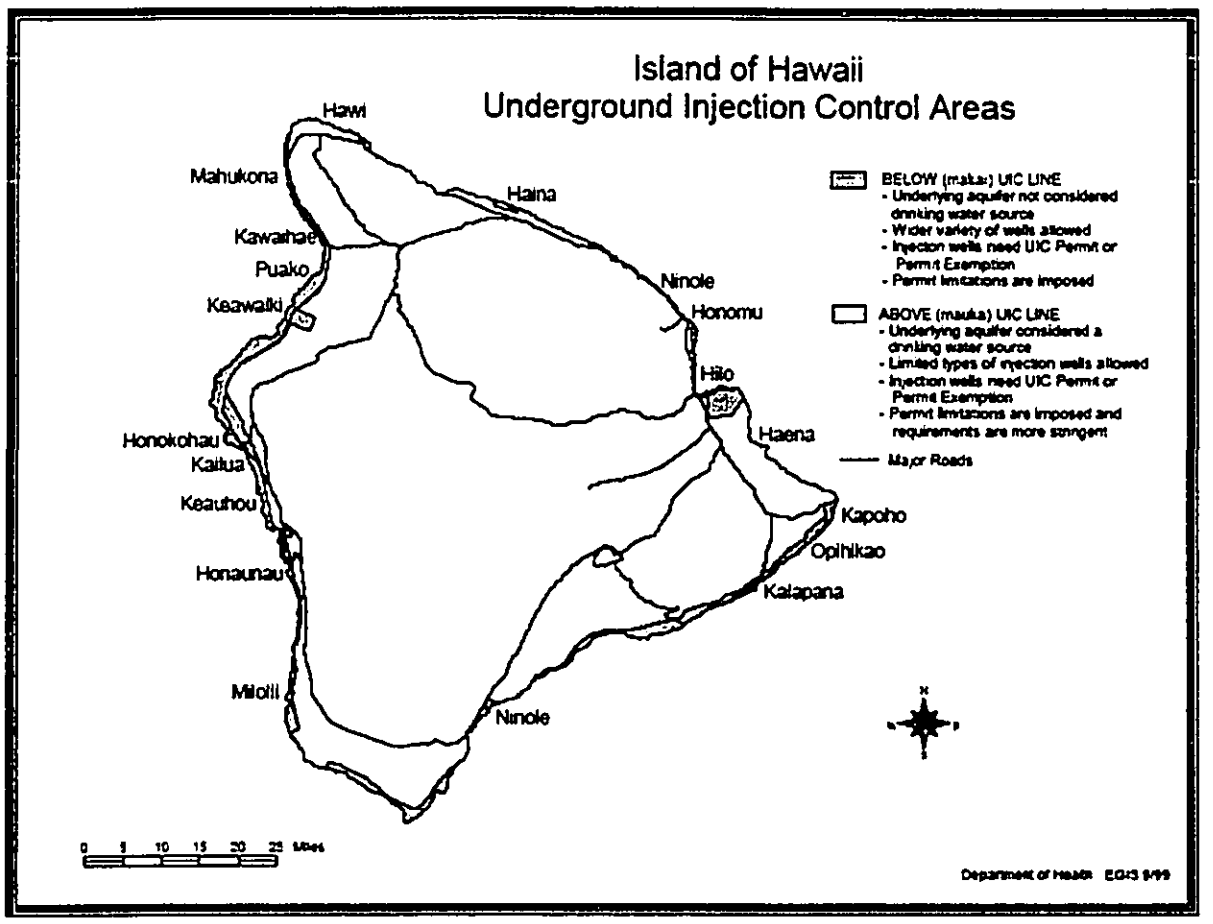
Key: 17: Aerial view looking west from from DHHL Lots to Ainaloa. Makai end of access road at lower left. 18: Aerial view looking north by northeast from near well site, along access road, to end of access road (existing street in photo center).

Figure 4



Source: Hawaii State Commission on Ground Water Management

Figure 5


Island of Hawaii
Underground Injection Control Areas
Hawi
Mahukona
Kawaihae
Puako
Keawaiki
Honokohau
Kaiua
Keauhou
Honaunau
Milolii
Hala
Ninole
Honomu
Hilo
Haena
Kapoho
Opihikao
Kalapana
Ninole
BELOW (makai) UIC LINE
- Underlying aquifer not considered drinking water source
- Wider variety of wells allowed
- Injection wells need UIC Permit or Permit Exemption
- Permit limitations are imposed
ABOVE (mauka) UIC LINE
- Underlying aquifer considered a drinking water source
- Limited types of injection wells allowed
- Injection wells need UIC Permit or Permit Exemption
- Permit limitations are imposed and requirements are more stringent
Major Roads
0 5 10 15 20 25 Miles
Department of Health EQAS 9/99

MAKU'U OFFSITE WATER SYSTEM PHASE 2

ENVIRONMENTAL ASSESSMENT

APPENDIX 2

AGENCY COORDINATION LETTERS

AND PUBLIC INVOLVEMENT

Part A: Comments in Response to Pre-Consultation

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
345 KEKUANAOA STREET, SUITE 20 • HILO, HAWAII 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

October 29, 2003

Mr. Ron Terry, Ph. D.
Project Environmental Consultant
HC 2 Box 9575
Keaau, HI 96749

ENVIRONMENTAL ASSESSMENT FOR
MAKU'U OFFSITE WATER SYSTEM, PHASE 2
EXPLORATORY WELL MASTER PLAN
MAKU'U, PUNA, ISLAND OF HAWAII
TAX MAP KEY 1-5-010:004 AND 1-5-008:003

Subject to your invitation, we have reviewed the subject assessment and find no exceptions. For your information, we reviewed the subject water master plan and determined it was acceptable.

Please send us a copy of the Draft Environmental Assessment upon completion.

Should there be any questions, please call Mr. William Atkins of our Water Resources and Planning Branch at 961-8070.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

WA:sco

copy - Mr. William Makanui, State of Hawaii, Department of Hawaiian Home Lands

... Water brings progress...

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

January 20, 2004

Dr. Bob Rechtman
Rechtman Consultant Services, Inc.
HC1, Box 4149
Kea`au, Hawaii 96749

LOG NO: 2004.0115
DOC NO: 0401PM09

Dear Dr. Rechtman:

SUBJECT: **Chapter 6E-42, National Historic Preservation Act—Section 106 Compliance, and National Environmental Policy Act (NEPA)**
Draft Report (RC-0190): "Archaeological and Limited Cultural Assessment for the Proposed DHHL Maku'u Water System" (Rechtman 2003)
[State/DHHL]
Halona and Maku'u, Puna, Hawaii Island
TMK: (3) 1-5-08:01

Thank you for the opportunity to review and comment on the above referenced report, which was received in our office on December 15, 2003. The report was prepared for Dr. Ron Terry of Geometrician.

The report presents the results of an archaeological and cultural impact assessment for a proposed water well/reservoir and waterline to supply Department of Hawaiian Home Lands (DHHL) beneficiaries at the Maku'u Farms and Agricultural Subdivision in Puna. You have indicated that the report is meant to fulfill various County, State, and Federal regulatory requirements. The purpose of the assessment was to determine the presence and significance of any historic properties, including traditional cultural properties, that might exist in the proposed project area and the need, if any, for mitigation.

We believe that the assessment of the proposed well/reservoir and related infrastructure was adequate. No historic properties were found in an archaeological survey of the study area, which consists of a roughly 7000 foot long access road and waterline corridor and the well/reservoir site which measures 200 by 200 foot. A partial examination of nearby Pahoa Cave suggests that there are no chambers of this cave system within the Area of Potential Effect. No traditional cultural properties were identified by any of the organizations and individuals that were consulted about such sites. We have a couple of minor comments on the report (see Attachment).

Attachment

Detailed Comments on Draft Report

"Archaeological and Limited Cultural Assessment for the Proposed DHHL Maku'u Water System"

(Rechtman 2003)

Introduction

Page 4, para. 1. The "Traditional cultural property" definition that appears here is no longer in use by our office. It was removed from HAR 13-275-2 prior to the Governor signing off on our rules. To avoid any possible confusion, we suggest that you delete this material and just use the Federal definition.

Project Area Description

Page 4. Please add the corridor width to the study area description.

We agree that while it is unlikely that any historic properties will be affected by the proposed water well/reservoir project, archaeological monitoring of the initial grubbing of the project area should be undertaken as a precaution given the potential for finding undiscovered lava tubes in this area.

Your report meets with our approval with the understanding that you will address our minor comments and submit corrected replacement pages. The next step in the historic preservation review process will be the development and implementation of a monitoring plan.

If you should have any questions about this project please contact our Hawaii Island archaeologist, Patrick McCoy, at (808) 692-8029

Aloha,

P. Holly McEldowney

P. Holly McEldowney, Administrator
State Historic Preservation Division

c. Chris Yuen, County of Hawaii Planning Department
Kai Emler, County of Hawaii Department of Public Works

PM:ak

MAKU`U OFFSITE WATER SYSTEM PHASE 2

ENVIRONMENTAL ASSESSMENT

APPENDIX 2

AGENCY COORDINATION LETTERS

AND PUBLIC INVOLVEMENT

Part B: Comments to Draft EA and Responses

Harry Kim
Mayor

Christopher J. Yuen
Director

Roy R. Takemoto
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-3043
(808) 961-8288 • Fax (808) 961-8742

March 5, 2004

Mr. Ron Terry
Geometrician Associates
HC 2 Box 9575
Keaau, HI 96749

Dear Mr. Terry:

Subject: Draft Environmental Assessment (EA)
Applicant: Department of Hawaiian Home Lands
Project: Maku'u Offsite Water System, Phase 2
TMK: 1-5-8:por. of 1 and por. of 8, Puna, Hawaii

In response to your submittal which we received on February 24, 2004, we have the following to offer for the construction of an exploratory and production well, reservoir, access road, pipeline, electrical poles and lines and appurtenant facilities:

3.3.1 The County zoning for the subject parcel should be changed from Agricultural (A-40a) to Agricultural (A-20a).

3.5 Pursuant to Hawaii County Code, Section 25-4-11(b), the proposed project is permitted provided that the Director has issued plan approval for such use. However, the final EA should indicate that the applicability of County land use law is qualified by the provisions of the *Memorandum of Agreement Between the County of Hawaii and the Department of Hawaiian Home Lands* which was signed in 2002. A copy of this agreement is enclosed for your perusal.

Appendix 2 – Agency Coordination Letters and Public Involvement
As a reminder, the Final EA requires that all comment letters received during the 30-day review period require a response addressed directly to the commenter. Copies of all comment letters and the responses to the letters must be included in the final EA.

If you have questions, please feel free to contact Esther Imamura or Larry Brown of this office at 961-8288.

Sincerely,

CHRISTOPHER J. YUEN
Planning Department

ETI:pak
P:\WPWIN60\ETI\EA\TerryMakuu15008001008.doc

Enclosure

xc: Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu HI 96813

Mr. William Makanui
Hawaii State Department of Hawaiian Home Lands
P. O. Box 1879
Honolulu HI 96806

Memorandum of Agreement Between the County of Hawaii and the Department of Hawaiian Home Lands

I. Purpose

The purpose of this Memorandum of Agreement (MOA) is to clarify the respective roles, responsibilities, and obligations of the County of Hawaii (County) and the Department of Hawaiian Home Lands (DHHL) relating to land use planning, infrastructure maintenance, enforcement of laws, and collection of taxes and other fees on Hawaiian home lands.

II. Guiding Principles

The following general principles have guided the development of this MOA:

A. The Hawaiian Homes Commission is responsible for determining land use on Hawaiian home lands. The County may not use its land use and zoning powers to prevent the Hawaiian Homes Commission from controlling the use of Hawaiian home lands.

B. The County and DHHL share common goals in planning for the use of Hawaiian home lands: both support the orderly development of those lands for the benefit of native Hawaiians and both are committed to the integration of planning by DHHL and Hawaii County.

C. The County should manage and maintain all infrastructure built to County standards

D. The County is authorized to enforce criminal laws and applicable County ordinances and regulations on Hawaiian home lands.

E. Hawaiian homestead lessees are residents of the County of Hawaii and should be treated in a manner consistent with all other residents of the County.

F. Hawaiian homestead lessees should pay all taxes and fees required by law.

G. The County and DHHL acknowledge that there are areas where agreement will not be reached, and agree to continue to work together toward a mutually acceptable resolution of such issues.

III. Relating to Planning and Land Use

A. DHHL will implement its Planning System which includes plans with DHHL land use designations such as the Hawaii Island Plan, various Development and Subdivision Plans, and Homestead Community Plans. In the formulation, updating, and amendment of these plans, DHHL will consult with the relevant County departments, and shall give due consideration and weight to their

IV. Relating to Public Facilities and Infrastructure Serving Hawaiian Home Lands

A. In the development of future projects, DHHL will construct public facilities in accordance with County standards. Where departures from County standards are desired, DHHL will pursue exemptions and other administrative variances from the appropriate County department, in accordance with procedures established for all property owners. Should DHHL choose not to construct infrastructure in accordance with County standards, the County may view such improvements as private facilities for repair and maintenance purposes.

B. The County will accept operation, repair, and maintenance of all future DHHL infrastructure constructed according to County standards.

C. Existing infrastructure shall be subject to County inspection prior to being accepted by the County for operation, repair, and maintenance. The County may require DHHL to repair any damage such as leaks, holes, sags, or deterioration affecting the operation of the existing infrastructure, identified as a result of the inspection.

D. In the case of existing infrastructure that is not constructed to County standards, the County and DHHL will work to establish minimum standards for residential, agricultural, and pastoral subdivisions. Existing projects will be evaluated based on these new standards. The County may require DHHL to upgrade the infrastructure to the minimum standard prior to being accepted by the County for operations, repair, and maintenance.

E. The County will maintain infrastructure according to its own standards, resources and schedules. Any decisions as to upgrades or rehabilitation will be at the County's discretion.

F. Should DHHL elect to convert its land to a more intensive land use, DHHL will be responsible for upgrading the onsite infrastructure to accommodate the new use, and will consult with the County regarding the need to upgrade offsite infrastructure. DHHL and the County shall negotiate the extent to which DHHL will be responsible for any such offsite improvements requested by the County. DHHL shall be responsible for project-related offsite improvements to the extent that these would be required of other developers with similar projects. If offsite improvements benefit other property, DHHL and the County shall cooperate so that DHHL bears only its fair share of these improvement costs.

G. The County will treat DHHL lessees in the same manner as other property owners with respect to conformity with laws, ordinances, and regulations. The County will advise DHHL of violations, and will refer cases of ongoing violation to DHHL after the County has exhausted all remedies short of pursuing legal action

G. The County and DHHL shall work to establish a customer trust fund by July 1, 2004 to collect real property tax payments as part of the mortgage/loan payments in order to make smaller, regular payments.

VII. Areas for Further Collaboration

The parties agree to work further on the following issues:

A. The creation of new County zoning districts for farming and pastoral activities.

B. The development of infrastructure standards for rural land uses such as agricultural and pastoral activities.

C. The establishment of procedures for sharing evidence, information, and testimony involving criminal violations on Hawaiian home lands.

D. The implementation of actions to prevent and/or address future real property tax delinquencies by Hawaiian homestead lessees.

VIII. Termination

To achieve the objectives of this MOA, either party may, by mutual agreement in writing, further clarify or waive any term or condition of this agreement, provided such action does not violate any statutes, ordinances, or binding rules or regulations. DHHL and the County reserve the right to terminate this MOA upon one hundred eighty (180) days notice in writing to the other party.

In agreement thereof, the parties have entered into this Memorandum of Agreement on this ____ day of _____, 2002.

COUNTY OF HAWAII

By _____
Harry Kim, Mayor

DEPARTMENT OF HAWAIIAN HOME LANDS

By _____
Raynard C. Soon, Chairman
Hawaiian Homes Commission

APPROVED AS TO FORM:

By _____
Corporation Counsel

By _____
Deputy Attorney General

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

May 13, 2004

The Honorable Christopher J. Yuen, Director
Hawai`i County Planning Department
101 Pauahi Street, Suite 3
Hilo Hawaii 96720

Dear Mr. Yuen:

Subject: Makuu Offsite Water System, Phase 2
Draft Environmental Assessment (EA)
Halona, Makuu, Puna, Island of Hawaii

Thank you for your letter of March 5, 2004 commenting on the Draft EA. We offer the following point-by-point responses to your comments, prepared with the assistance of Geometrician Associates, our consultant for the project:

1. *County Zoning.* The zoning category has been changed to A-20a in the Final EA.

2. *Applicability of County Land Use Law.* Thank you for clarifying this issue and providing a copy of the *Memorandum of Agreement Between the County of Hawai'i and the Department of Hawaiian Home Lands* (MOA). The Final EA now states that the applicability of County land use law is qualified by the provisions of the *Memorandum of Agreement Between the County of Hawai'i and the Department of Hawaiian Home Lands,* executed on December 27, 2002.

3. *Comment Letters.* As always, all comment letters and responses will be included in the Final EA.

We hope these responses address your concerns and should you have any questions regarding the preparation or contents of the EA, please call Mr. Ron Terry of Geometrician Associates, LLC at (808) 982-5831.

Should you have any questions regarding the project itself, please feel free to call Mr. Larry Sumida of our Land Development Division at 587-6452.

Aloha and Mahalo

Micah A. Kane, Chairman
Hawaiian Homes Commission

c: Geometrician Associates, LLC
Engineers Surveyors Hawaii, Inc.
DHHL, LDD

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

March 23, 2004

Mr. William Makanui
Department of Hawaiian Home Lands – State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96806

Ron Terry, Ph.D.
HC 2 Box 9575
Keaau, Hawaii 96749

Dear Mr. Makanui and Dr. Terry:

The Office of Environmental Quality Control (OEQC) has reviewed the draft environmental assessment for the Maku`u Offsite Water System Phase 2, Tax Map Key (3rd) 1-5-08: portion 1 and portion 8, in the judicial district of Puna, and offers the following comment for your consideration.

1. TWO SEPARATE ENVIRONMENTAL ASSESSMENTS NEEDED FOR EXPLORATORY WELL DEVELOPMENT AND PRODUCTION: Please refer to the "***Guidelines for Assessing Water Well Development Projects***" (OEQC, 1998), found on the Internet at http://www.state.hi.us/health/oeqc/index.html. Environmental assessments for exploratory wells will not have all of the information requested in the guidance above. As such, a ***separate environmental assessment*** would need to be prepared if and when the well yields positive results and demonstrates production capability.

Thank you for the opportunity to comment. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist, at (808) 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

May 13, 2004

To: Genevieve Salmonson, Director of OEQC
Department of Health

From: Micah A. Kane, Chairman
Hawaiian Homes Commission

Subject: Makuu Offsite Water System Phase 2
Environmental Assessment (EA)
Makuu, Popoki & Halona, Puna, Island of Hawaii,

Thank you for your letter of March 23, 2004 concerning the Draft EA for the subject project.

We would like to offer the following response to your comment that two separate EAs are required, pursuant to the guidelines from OEQC offered on your website, prepared with the assistance of our consultant, Geometrician Associates, LLC.

The basic purpose of having two separate EAs is to allow review of data from the pump tests for the exploratory well. In some areas of the State of Hawai'i, these data may contain crucial environmental information, or negative results may indicate a need for another exploratory well in a different location. Pump tests may indicate that groundwater is not present where it was suspected to exist, or not present in sufficient quantities to economically pump. These tests may indicate that pumping of an exploratory well adversely affects other wells nearby or nearby water bodies, or that water contains too many chlorides or is contaminated by natural or human sources.

Of all these issues, effects on nearby wells are of key importance, because the other issues are essentially questions of cost-benefit or go/no-go decisions, rather than environmental concerns. It is important to note that EAs that cover exploratory wells may not cover wider socioeconomic and planning issues, as these are considered premature and may be dealt with in the EA for the production well.

The Department of Hawaiian Home Lands decided that, in this case, the most rational course of action was to combine the two Environmental Assessments into one, for the following specific reasons:

- The basal aquifer in this area is a known resource of high volume and high quality at a known elevation, and there is almost no reason to believe that a test well will not find an adequate source.

- Because of the land use context, with no development upslope or surrounding the well site itself, the possibility for contamination is exceedingly slight.

- There are no nearby wells that could conceivably be affected by pumping at the test well location. It is typical for the cone of depression (the area of the aquifer that experiences a drawdown based on pumping from a well) to extend out no farther than a few hundred feet in the Pahoa Aquifer. As the nearest wells lie nearly two miles away near Highway 130 in Keonepoko, there is virtually no chance for effects.

- In some aquifers, sustainable yield may be a critical question, but in this particular aquifer, in which pumpage is less than 0.5 percent of estimated sustainable yield, there is clearly no risk of regional aquifer depletion.

- There is no other reason, environmental or other, for preparation of two separate EAs. Socioeconomic and planning issues have been fully considered. Including the information in one EA will save time and money for this vitally necessary project.

- Since this project will in part service 78 existing DHHL farm lots that have had to rely on catchment systems since 1998, deferring the preparation of a second EA for the production facilities until pumping test results are received would unnecessarily delay water delivery to them.

We appreciate your assisting us in the environmental review of our project and hope these responses address your concerns.

Should you have any questions regarding the preparation or contents of the EA, please call Mr. Ron Terry of Geometrician Associates, LLC at (808) 982-5831.

Should you have any questions regarding the project itself, please feel free to call Mr. Larry Sumida of our Land Development Division at 587-6452.

c: Geometrician Associates, LLC
Engineers Surveyors Hawaii, Inc.
DHHL, LDD

To: Ron Terry - Consultant, Geometrician Associates LLC.

From: David Paul - President, Big Island Native Plant Society

RE: Maku'u Offsite Water System Phase 2; Maku'u, Island of Hawai'i; State of Hawai'i. Draft Environmental Assessment.

Attention Mr. Terry,

Ke'Onipa'a' Choy and other concerned Hawaiian groups contacted me that there is a project in previously undeveloped lands, which you are involved with.

On March 8 & 9 Ke'Onipa'a' and I went to and observed the project area. Upon visiting the proposed easement to the well site, I noticed that the Biological Survey was poorly done:

The account of species was incomplete and incorrectly identified.

There are rare plants (Scaevola kilaueae) found directly in the corridor.

There are wetland features found directly in the corridor.

Species Accounts :

The community most resembles an 'ohi'a / kuolohia / uluhe (Metrosideros / Rhyncospora / Dicranopteris) lowland wet mixed community. (Gagne & Cuddihy, 1990, p.87.) The 'ohi'a and uluhe occur on well drained areas of the community. The kuolohia (R. chinensis) occurs in saturated boggy soil, and is commonly found with nutrush (Scleria testacea) and Cretan brake fern (Pteris cretica).

The Fimbristylis should be identified as Rhynchospora chinensis. The Cladium should be identified as Scleria testacea. These two indigenous species cover most of the saturated areas and help to define the wetlands of the area.

The sandalwood species identified as Santalum paniculatum is actually S. ellipticum as easily explained in the keys (Wagner, W. L., et al. 1990.)

If the Nephrolepis sp. is actually a hybrid, a sample should be verified by the author (Daniel Palmer).

The Indigenous and Endemic list of species should also include:

Cocculus trilobus	huehue	I
Macherina angustifolia	'uki	I
Ophioderma pendulatum	puapuamoa	I
Psilotum nudum	moa	I
Scaevola kilaueae	huahekili'uka	E
Vaccinium reticulatum	'ohelo	E

Rare Plants:

In the beginning reaches of the proposed easement the huahekili'uka plant (Scaevola kilaueae) of Kilauea was found directly in the corridor. This was erroneously identified as Scaevola chamissoniana. This plant is a member of an unrepresented population of a rare species which has been in decline in the National Park (HVNP) for several years and needs to be studied.

Within the proposed easement eight stands of Scaevola sp. were observed. From the beginning of the corridor, the first six stands were S. kilaueae. A single stand in the upper reaches was identified as S. chamissoniana. One stand towards the end of the corridor was not in flower, but appears to be a S. kilaueae.

The 'iliahi (Santalum ellipticum) is commonly found from the mid to upper reaches of the project area. These plants are not considered rare State wide but are rare in this community.

Wetland Features:

Delineation of Wetlands according to the US Army Corps of Engineers criteria ("Recognizing Wetlands", Sept./1990.) includes:

- Water.
- Hydric soils.
- Wetland plants.

From the Middle to Upper reaches of the proposed easement, several ponds are found directly in the corridor. There is so much water that all of the low lying areas are saturated and boggy during most of the year to the point where algae excludes any unperched and undrained stands of plants. Several ponds found directly on the easement appear to be permanent; having waters up to two feet deep when all surrounding lands are drained.

These ponds have muck soils with a sulphorus odor , algae, and invertebrate fly-like (Dipteraceae) life forms. Kuolohia (Rhyncospora. chinensis) and nutrush (Scleria testacea) dominate the vegetation in these ponds and delineate their borders.

During March 9, 2004 we observed Anax strebulus, the Hawaiian Dragonfly along the project area.

This wetland habitat may be an opportunistic environment by the rare Kapoho Damselfly (Megalagrion xanthomeles). (Polhemus & Asqith, 1996, "Hawaiian Damselflies: A Field Identification Guide.") A qualified entomologist should study the project area to determine if Megalagrion sp. or other sensitive invertebrate species are present.

Most of the plants in this mixed community are "facultative" members of wetland habitats. (USFWS,1988, "National List of Plant Species that occur in Wetlands: Hawai'i , Region H.")

The State of Hawai'i recommends that actions occurring in or adjacent to a wetland area triggers the EIS system.

Comments and Suggestions:

If Botanical Keys are used correctly the interpreter will not be wrong. If identifying the taxa is left to conjectures then one will always make mistakes.

The consultant failed to use experienced biologists and needs to understand that such is necessary when making evaluations on pristine lands.

The Big Island Native Plant Society is concerned with any project that involves undeveloped land areas, as these lands are most likely to contain sensitive and rare species of plants and animals.

According to the initial assessment; the well can be placed "as close as 100 feet apart" from existing Keonepoko Nui 2 well- reservoir "without any adverse interference between wells". Wouldn't it be possible to place the well site in a less environmentally sensitive location, such as at the beginning of the proposed easment where rare plants do not occur and there are no wetland issues?

Sincerely,

David Paul

David Paul - President
Big Island Native Plant Society
PO Box 2081
Kea'au, Hawai'i HI. 96749-2081

cc: OEQC
DHHL
USFWS
US Army Corps of Engineers

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

May 13, 2004

Mr. David Paul, President
Big Island Native Plant Society
P.O. Box 2081
Keaau, Hawaii 96749-2081

Dear Mr. Paul:

Subject: Makuu Offsite Water System, Phase 2
Draft Environmental Assessment (DEA)
Halona, Makuu, Puna, Island of Hawaii

Thank you for your letter regarding the DEA for the subject project. Although your letter was received at the Department of Hawaiian Home Lands (DHHL) on March 25, 2004, after the end of the 30-Day comment period required by HRS 343 (which was March 24, 2004), we offer the following responses to your comments. The responses, particularly those pertaining to your botanical concerns, were prepared with the assistance of our consultant for the project, Geometrician Associates.

1. *Species Discrepancies.* Thank you for reviewing the species list and noting certain problems with it. We appreciate your training and devotion to botany.

Due to an error transcribing the field notes to the species list, several species - moa, huehue, puapuamoa and ʻuki in particular - were inadvertently omitted. These have been added to the Final EA (with the correct spelling, which your letter did not supply in all cases). Our consultant did not observe ohelo, but have added it to their list based on your observation. Our consultant agrees with your classification of the sedges and will change their identification in the report, although they believe that the *Rhynchospora* species is *caduca*, not *chinensis*.

Although the leaves of the *Scaevola* our consultant observed appeared to best match *kilaueae* rather than *chamissoniana*, all flowering specimens observed had very white (not cream) lobes. The floral tubes were also white, not purplish-brown as *kilaueae*

is described in the manual. Based on this, and the fact that the *Manual of the Flowering Plants of Hawai`i* noted that *kilaueae* was found from 1,000 to 1,460 meters in elevation, whereas the site was near 200 meters, our consultant identified the plants as *chamissioniana*.

However, after presenting several specimens to experts at Hawaii Volcanoes National Park, your identification of at least some individuals as *kilaueae* was confirmed. As indicated in the Manual as well, *Santalum ellipticum* and *Santalum paniculatum* are closely related and have been "lumped" by some as members on one species. Based on the discussion of similar upper and lower leaf surfaces in the Manual, and the fact that the Manual does not list the species as present in Puna, our consultant classified the specimens as *paniculatum*, which was concurred with by plant experts at the Park when shown sample specimens. In deference to your expertise, however, we will note that you identified the species as *ellipticum*. Our consultant does not concur with your classification of the community as *Metrosideros Rhynchcspora/ Dicranopteris*, which is noted in the Manual as occurring in a restricted area of Kaua`i and including *Antidesma, Lobelia, Viola, Pelea (Melicope)*, and other elements that are not present in Maku`u.

2. *Wetlands.* While we agree that a number of small, isolated wetlands are present in the corridor - as they are in virtually all pahoehoe environments in Puna, including thousands of acres of agricultural and residential lots that have been and are currently being developed - they lack a surface connection to any stream, tributary or ditch, and are not tidal, and are thus considered isolated by the U.S. Army Corps of Engineers.

As such, they are not regulated under Section 404 of the Clean Water Act. No adverse effects on local ecosystems, watersheds or other values would be expected as a result of the proposed project. We have coordinated with the U.S. Army Corps of Engineers concerning the project and they have concurred with this finding.

3. *Entomological Survey.* While native insects may be present, the small scale of the project and the large area of undisturbed land mauka indicate that there is no justification for such a study, as it is extremely doubtful that constructing a reservoir pad and gated access road would have an effect on such species.

4. *Location of Well and Reservoir.* Although from a strict hydrological standpoint, the well could be placed nearer the existing wells, spacing wells farther apart reduces the chances that some source of contamination in the aquifer near the highway would disrupt the water system.

   Even more importantly, a reservoir with its base at elevation 824 feet (overflow at elevation 844 feet) is still required to provide adequate water pressure to the lots in the high service area. This elevation is based on the Hawai'i County Department of Water Supply's (DWS) system requirements. Thus, even if the well was not constructed at the proposed site at elevation 824 feet, the reservoir - along with access road, water line, sitework and water system facilities - would need to be constructed in this general area.

I thank you for participating in the environmental review process and hope these responses address your concerns. Your participation in the DEA review is a valuable part of a planning process and a method of disseminating accurate information that benefits all parties.

Should you have any questions regarding the preparation or contents of the EA, please call Mr. Ron Terry of Geometrician Associates, LLC at (808) 982-5831.

Should you have any questions regarding the project itself, please feel free to call Mr. Larry Sumida of our Land Development Division at 587-6452.

Aloha and Mahalo,

Micah A. Kane, Chairman
Hawaiian Homes Commission

c: Geometrician Associates, LLC
Engineers Surveyors Hawaii, Inc.
DHHL, LDD

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

In Reply Refer to:
1-2-2004-I-115

APR 20 2004

Ron Terry
Geometrician Associates
HC 2 Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

Thank you for your February 16, 2004, letter regarding the Hawaii State Department of Hawaiian Home Lands (DHHL) proposed project to develop additional potable water for its Makuu Farm and agricultural lots in Makuu, Hawaii. Ground disturbance in areas outside existing water supply properties, roadway, or pipeline corridors would occur on TMK 1-5-8:01 and 03, with connection to existing facilities at TMK 1-5-8-08. DHHL proposes construction of an exploratory and production well, reservoir, access road, pipeline, electrical poles and lines, and appurtenant facilities. Elizabeth Sharpe from our office talked with you on March 26, 2004, to confirm that a deadline of April 22, 2004, for our written response would be acceptable to you. Your letter was received in our office on February 24, 2004.

Based on our review of the information contained in your letter and in our files, including maps prepared by the Hawaii Natural Heritage Program, the endangered Hawaiian hawk (*Buteo solitarius*) and Hawaiian hoary bat (*Lasiurus cinereus semotus*) have been sighted in the vicinity of the project. No large trees appropriate for nesting by the Hawaiian hawk are present on the access road or reservoir site. Ground construction activities may possibly disrupt the foraging activities of Hawaiian hawks or bats in the area. In addition, the endangered Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*) and the threatened Newell's shearwater (*Puffinus auricularis newelli*), may also fly over the project site. In a message that you left for Elizabeth Sharpe on April 15, 2004, you stated that no night work would occur on this project so there will be no need for the use of lights which can attract and confuse seabirds. Because the displacement of the Hawaiian hawk and bat will be minimal and of a temporary nature and no night work will occur on this project, we agree with your finding that there will be no effect to listed threatened or endangered species and no effect on critical habitat.

On March 25, 2004, we received a letter from David Paul, president of the Big Island Native Plant Society. In his letter, Mr. Paul states that there are a number of native species within the project area, including the rare plant *Scaevola kilaueae*. *Scaevola kilaueae* is categorized as a species of concern and according to the information in our files, there are fewer than 500 individuals in only two occurrences only on the island of Hawaii, Hawaii. Species of concern are not afforded protection under the Endangered Species Act. However, we would like to offer our technical assistance and we may contact you to discuss the information Mr. David provided on this species.

We appreciate your efforts to conserve endangered species. If you have any questions, please contact Elizabeth Sharpe, Fish and Wildlife Biologist (phone: 808/792-9400; fax: 808/792-9580).

Sincerely,

for R. Mark Sattelberg
Acting Field Supervisor

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

May 13, 2004

Mr. R. Mark Sattelberg
Acting Field Supervisor
Pacific Islands Fish and Wildlife Office
U.S. Fish and Wildlife Service
300 Ala Moana Blvd., Room 3-122
Honolulu, Hawaii 96850

Dear Mr. Sattelberg:

Subject: Draft Environmental Assessment (EA)
Maku`u Offsite Water System Phase 2

Thank you for your letter of April 20, 2004 concerning the Draft EA for the subject project. We offer the following responses to your comments which were prepared, particularly those pertaining to your botanical concerns, with the assistance of our consultant, Geometrician Associates, LLC.

1. *Night work.* The Department of Hawaiian Home Lands (DHHL) will commit to avoiding night work on the project, which we understand may attract and confuse several listed bird species. This information has been added to the Final EA.

2. *No Effect to Listed Threatened and Endangered Species.* We acknowledge your finding in this matter.

3. *Scaevola kilaueae:* Although the leaves of the *Scaevola* we observed appeared to best match *kilaueae* rather than *chamissoniana*, all flowering specimens observed by our consultant had very white (not cream) lobes. The floral tubes were also white, not purplish-brown as *kilaueae* is described in the manual. Based on this, and the fact that the *Manual of the Flowering Plants of Hawai`i* noted that *kilaueae* was found from 1,000 to 1,460 meters in elevation, whereas the site was near 200 meters, our consultant identified the plants as *chamissioniana*. However, after presenting several specimens to experts at Hawaii Volcanoes National Park, Mr. Paul's identification of at least some individuals as *kilaueae* was confirmed. DHHL understands that

this is a Species of Concern and would appreciate your consultation in this matter.

It may be possible to salvage individuals of this species before clearing of the road begins. DHHL is amenable to providing the U. S. Fish and Wildlife Service or their designate the opportunity to relocate individuals of *Scaevola kilaueae* from the disturbance corridor before it is grubbed by bulldozer. However, this would be subject to proper coordination such as obtaining authorized right-of-entry approvals from DHHL and DLNR prior to -- and completing plant removals -- at least 24 hours in advance of the earliest anticipated date bulldozer operations will begin which is June 9, 2004.

As this is only 3-1/2 weeks away, please contact William Makanui of DHHL at (808) 586-3818 as soon as possible if such a course of action is desired. To expedite matters, you may wish to contact our Hawaii Island Land Agent, Linda Chinn at (808) 587-6434 to initiate processing of the Right-of-Entry Permit from DHHL.

We suggest that DLNR should be contacted directly for authorization for right-of-entry onto their lands.

I thank you for assisting us in the environmental review of our project, hope these responses address your concerns, and should you have any questions regarding the preparation or contents of the EA, please call Mr. Ron Terry of Geometrician Associates, LLC at (808) 982-5831.

Should you have any questions regarding the project itself, please feel free to call Mr. Larry Sumida of our Land Development Division at 587-6452.

Aloha and Mahalo

Micah A. Kane, Chairman
Hawaiian Homes Commission

c: Geometrician Associates, LLC
Engineers Surveyors Hawaii, Inc.
DLNR, Land Management (Hawaii Island)
DHHL, LDD
DHHL, LMD

To:Department of Hawaiian Homelands
Aloha Mr. Makanui,
To follow up to our telephone discussion.

The Draft Environmental Assessment failed to represent the area of the proposed Maku'u Well site because: plant species were inaccurate, wetland features were not reported, and faunal species and their habitats were ignored. The proposed easement concerns a far more dangerous environmental issue than the consultant discloses.

The lack of information in this assessment disables the Hawai'i State Environmental Impact Statement (EIS) System from making sensible decisions concerning our Hawaiian environment, thus impairing their ability to manage vulnerable areas.

This project also inappropriately misappropriates resources from the Department of Hawaiian Home Lands, DHHL.
Endemic and Indigenous plant speceies:
hauhekili'uka....Scaevola kilaueae E
'ohelo.....Vaccinium reticulatum E
'uki.....Macherina angustifolia I
moa.....Psilotum nudum I
huehue.....Cocculus trilobus I
puapuamoa....Ophioderma pendulatum I

The finding of no hazardous materials in this area is a reckless presumption by the consultant as this location was once used by the Navy as the "Popoki" aerial bombing range and, no expert witnesses were utilized in the matter of finding this area free of hazardous materials. (US Army Corps of Engineers, 1991, Popoki Target Area, HI), Donaldson Ent., #H09HI28700DERP-FUDS Enclosed is a copy.

Road building in or adjacent to a wetland triggers a 404 permit process with the Army Corps of Engineers; and triggers the State of Hawai'i EIS system. This permitting process will be sidestepped unless the wetland located at this site is acknowledged.

A Finding of No Significant Impact, FONSI, is hereby contested in this project, as these environmental and cultural burial issues presented have been overlooked or eluded.

Also, DHHL water is allocated, and rightfully so, for Maku'u agricultural purposes. This water is reserved for use by DHHL beneficiaries living in the Maku'u Farm Lots.HHCA13-172-3.

The proposed DHHL funded well is to be hooked up to the existing Keonepoko Nui Reservoir via an unmetered 16" water main that will benefit commercial interests and other third parties usurping the DHHL funded infrastructure. We contest any use of these well water systems for any persons/entities other than "DHHL beneficiaries.

We also contest the use of DHHL funds being used to purchase a booster pump for the county's Keonepoko Nui Well.

If the well is placed at the beginning of the proposed easement on DHHL land, it will avoid rare plant, wet-lands and burial issues.

RECOMENDATIONS

*Build onsite DHHL parcel-A, not offsite. *Eliminate 7000' fenced access road.
*Connect farm water delivery system to DHHL well reservoir.
*Eliminate unmetered 16" water main to the county's reservoir.
*Eliminate DHHL funding of the replacement booster pump for the county's well system.
*Use DHHL funds for DHHL purposes.

Pono ia kakou ke malama i keia 'aina,
We must care for this land

Ali'i Ke'onipa'aloa'i'amoku

cc. geometrician ASSOCIATES LLC..
Army Corps of Engineers
OEQC

P.O. Box 1094
Olaa(?) Hawaii

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. H09HI028700
POPOKI TARGET AREA, HAWAII
31 DECEMBER 1991

SITE NAME(S): Popoki Target Area; Target Area Naval Air Station.

LOCATION: Makuu Popoki Halona, District of Puna, Island of Hawaii (refer to the attached site maps).

SITE HISTORY: Approximately 640 acres were acquired by the U.S. Navy through a sublease, date unknown, either with W.H. Shipman, Ltd. or H. Blackshear, then executor of Shipman Estate. The lease was cancelled on 1 November 1945. The land is now under the purview of the State of Hawaii Department of Hawaiian Home Lands (DHHL) and the County of Hawaii Civil Defense Agency (CDA). The Federal Aviation Administration leases a portion of the project site to operate an air traffic control beacon interrogator and a non-directional beacon. DHHL has subdivided the remainder of its parcel into five-acre farm lots reserved for individuals of Hawaiian ancestry. Though the County of Hawaii CDA has not constructed any site improvements, the agency's general lease agreement with the State of Hawaii requires its parcel be set aside for emergency use in conjunction with the subsurface lava tube system traversing the area.

SITE VISIT: A site visit was conducted on 19 July 1991 by Helene Takemoto and Charles Streck, Jr. (CEPOD-ED-ME), Byron Donaldson (Donaldson Enterprises, Inc.) and Wil Chee and Ivan Tilgenkamp (Wil Chee - Planning). The project site and surrounding area are principally pahoehoe lava gently sloping toward the coastline. Vegetation is dense consisting of staghorn fern, ohia trees, and three bladed cut grass.

Two types of air-to-ground ordnance were discovered within the farm lot subdivision in 1990 by B. Donaldson. They consisted of 4-pound mk 23 practice bombs with a mk 4 spotting charge, and 100-pound water/sand practice bombs. Locating ordnance at the site was difficult as the vegetation was dense and reached heights of six to eight feet. Consequently, unexploded ordnance was not observed during the 19 July 1991 site visit. Detailed information is in the project file.

CATEGORY OF HAZARD: OEW.

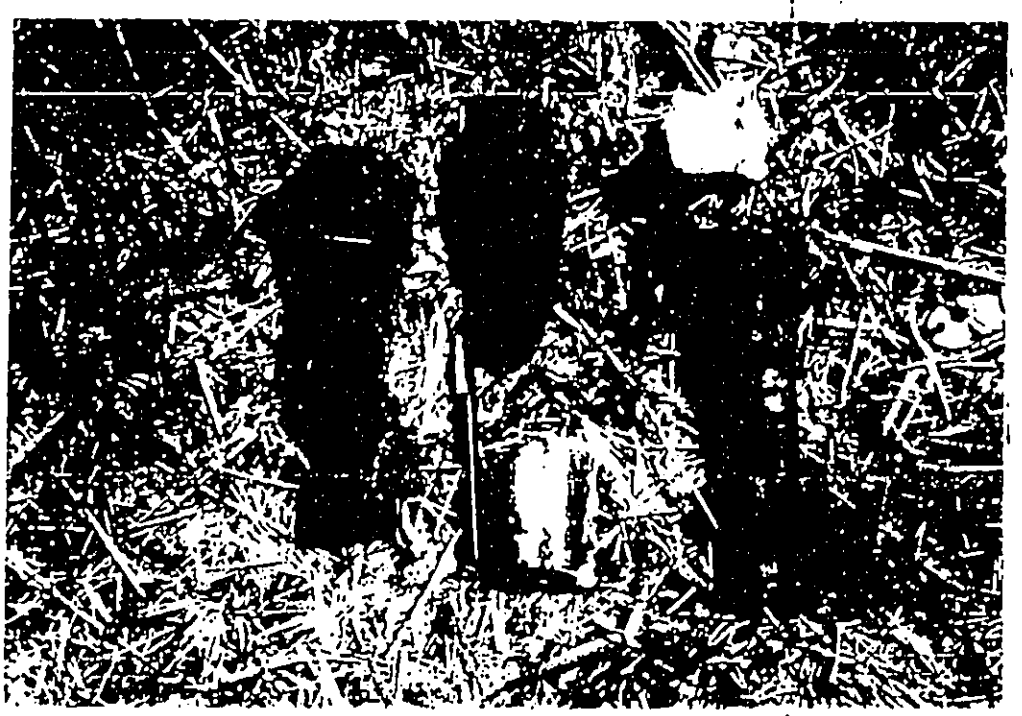
PROJECT DESCRIPTION: There is one potential project at this site.

a. OEW. Popoki Target Area is a former target range used by the U.S. Navy during World War II. Unexploded practice bombs were discovered in 1990. It may require investigation beyond the scope of this preliminary assessment.

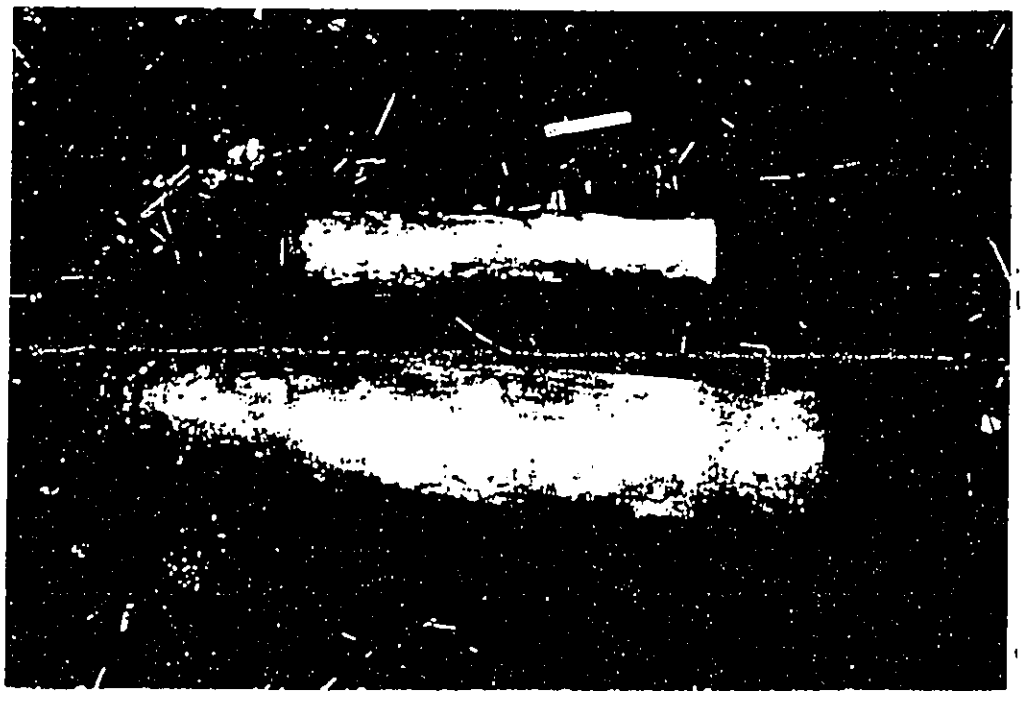
AVAILABLE STUDIES AND REPORTS: None identified.

PA POC: Helene Takemoto, CEPOD-ED-ME, (808) 438-6931.

RECEIVED AS FOLLOWS

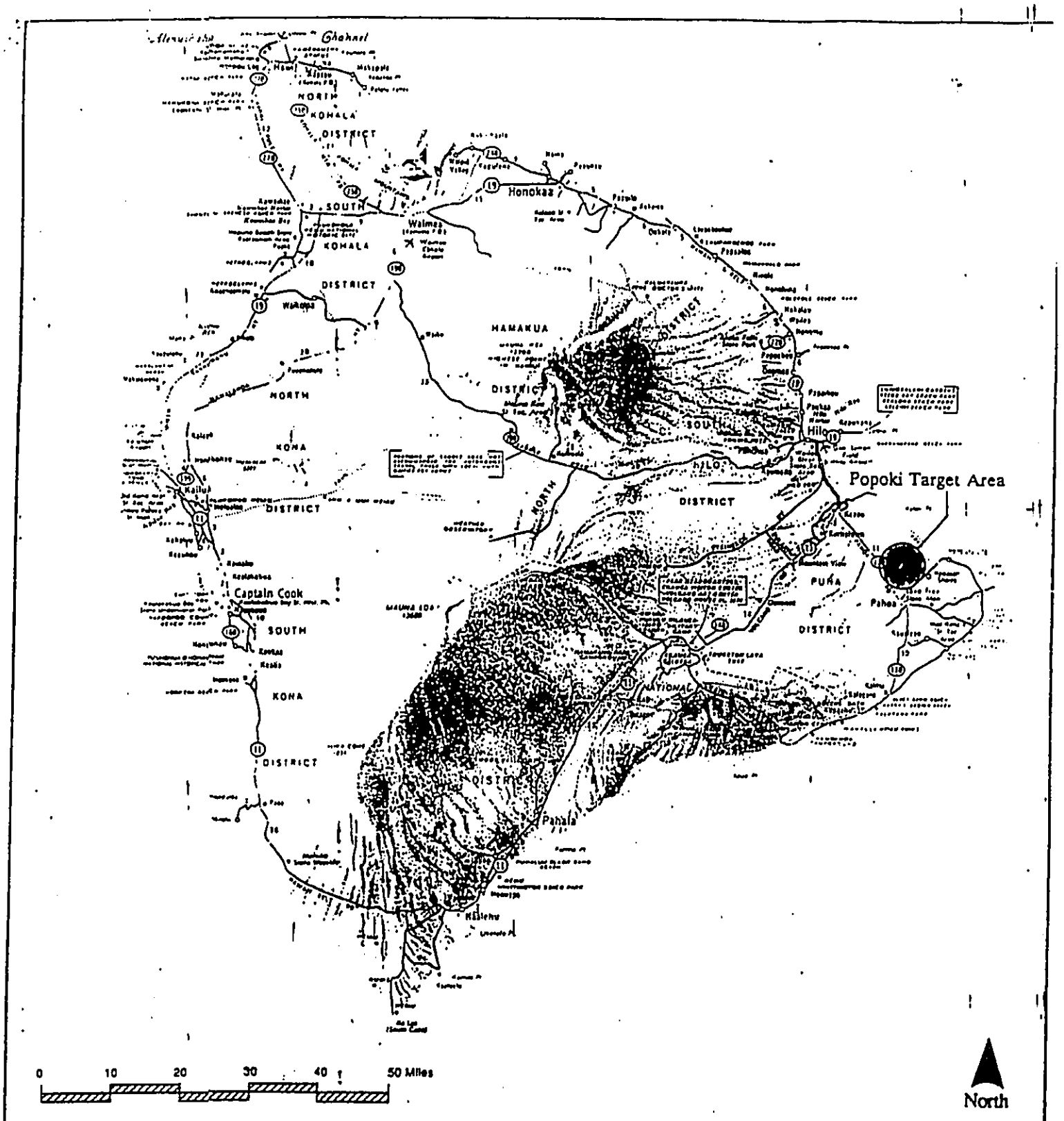


MK 23 Practice bombs.



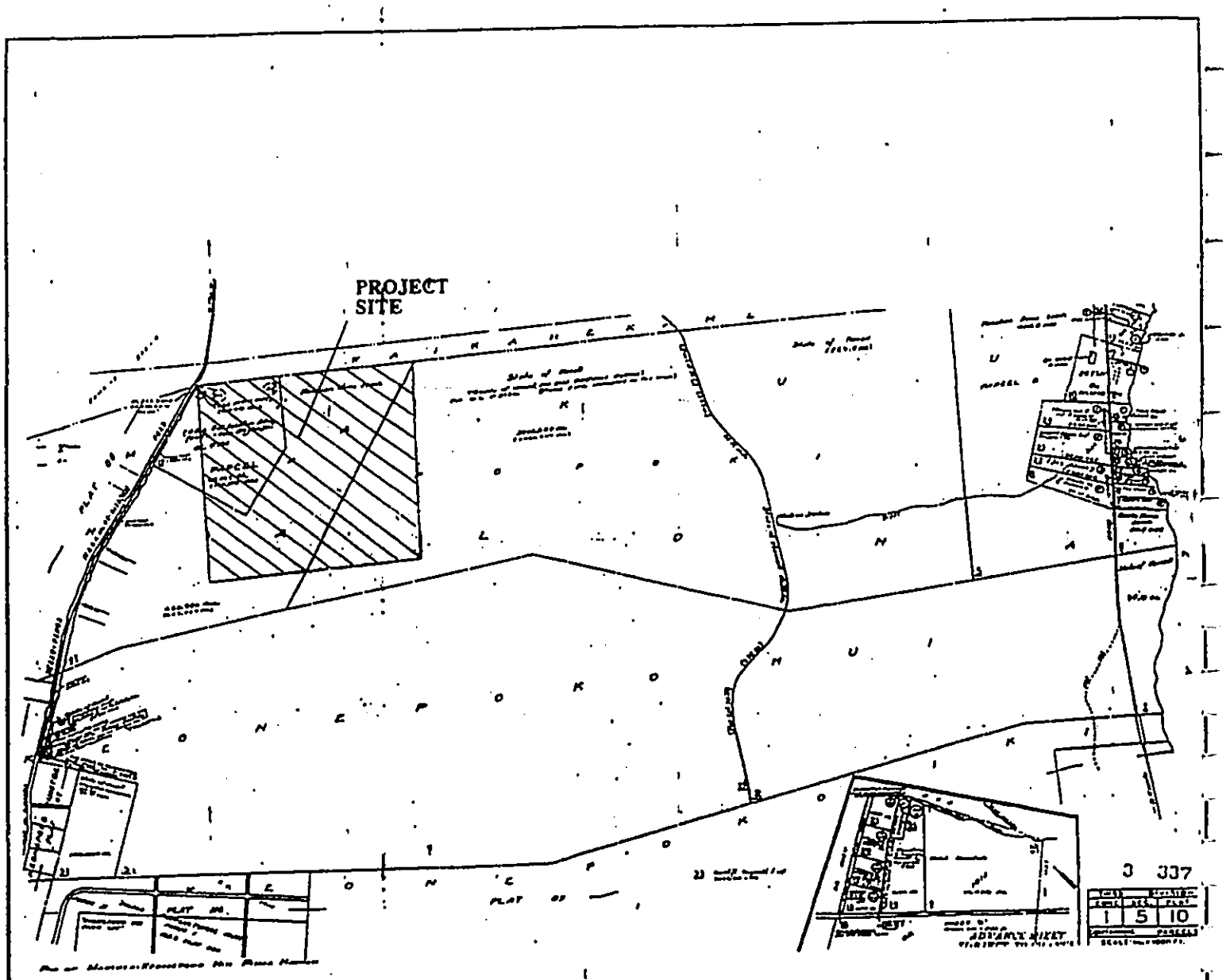
37 mm Cartridge case.
75 mm Cartridge case.

RECEIVED AS FOLLOWS



Prepared for: U.S. Army Engineer District Pacific Ocean Division Fort Shafter, Hawaii Prepared by: Wil Chee - Planning	DERP-FUDS Inventory Project Report (INPR) for Site No. H09HI28700 **Popoki Target Area, HI** Figure 1

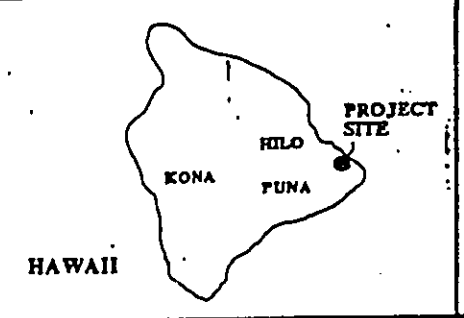
RECEIVED AS FOLLOWS



Recent real property tax map delineating the project site in relation to existing parcels owned or leased by the Department of Hawaiian Home Lands, Federal Aviation Administration, State of Hawaii, and County of Hawaii Civil Defense Agency.

0 1000 2000 3000 4000 5000 Feet

North



Prepared for:

U.S. Army Engineer District
Pacific Ocean Division
Fort Shafter, Hawaii

Prepared by:

Wil Chee - Planning
Honolulu, Hawaii

DERP-FUDS Inventory Project Report

(INPR) for Site No. H09HI028700

Popoki Target Area, HI

Figure 3

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

May 13, 2004

Mr. Ke'onipa'aloai'amoku
P.O. Box 1094
Kurtistown (Olaa), Hawaii 96760

Dear Sir:

Subject: Makuu Offsite Water System, Phase 2
Public Review of Draft Environmental Assessment (DEA)
Halona, Makuu, Puna, Island of Hawaii

Thank you for your letter regarding the DEA for the subject project. Although your letter was received at the Department of Hawaiian Home Lands (DHHL) on April 21, 2004, after the end of the 30-Day comment period required by HRS 343 (which ended March 24, 2004), we offer the following responses to your comments (in italics):

A. ***" . . . plant species were inaccurate . . ."***

Due to an error transcribing the field notes to the species list, several species, including most of the ones you mentioned, were inadvertently omitted. Our consultant did not observe ohelo, but have added it to our species list based on an observation by David Paul who submitted comments to the DEA under separate cover. None of these species is threatened or endangered, and the lack of their presence on an otherwise complete list has not hindered evaluation of the environment or the impacts of the project.

B. ***" . . . this location was once used by the Navy as the 'Popoki' aerial bombing range . . ."***

A copy of the DEA was submitted to the U.S. Army Corps of Engineers, who had no comments to offer on this target range.

Judging from the Corps of Engineers' map you enclosed, the approximate limits of the Popoki Target range are on the opposite side of Keaau-Pahoa Road from this project. The terminus of this project is over a mile southwest of the target range limits. Furthermore, the proposed additional DHHL development that the new production well is intended to serve is on the opposite side of Keaau-Pahoa Road beyond the target range limits.

Per the map, the target range is centered on the northernmost limits of the existing 5-acre farm lots of the "Makuu Farm Lots, Unit 1" subdivision completed November 1997. Sonomura Construction did not encounter anything to indicate the presence of unexploded ordnance during construction of that project nor have any of the lessees already living in this area since then.

Since this issue is more appropriate to the existing lessees rather than the proposed project, a copy of the map will be forwarded to our Homestead Services Division, which interfaces with them.

C. ***"Road building in or adjacent to a wetland triggers a 404 permit process with the Army Corps of Engineers; and triggers the State of Hawaii EIS system. This permitting process will be sidestepped unless the wetland located at the site is acknowledged."***

While we agree that a number of small, isolated wetlands are present in the corridor - as they are in virtually all pahoehoe environments in Puna, including thousands of acres of agricultural and residential lots that have been and are currently being developed - they lack a surface connection to any stream, tributary or ditch, and are not tidal, and are thus considered isolated by the U.S. Army Corps of Engineers. As such, they are not regulated under Section 404 of the Clean Water Act. No adverse effects on local ecosystems, watersheds or other values would be expected as a result of the proposed project.

We have coordinated with the U.S. Army Corps of Engineers concerning the project and they have concurred with this finding.

This discussion and a copy of the Corps' findings will be incorporated into the Final EA.

D. ***". . . environmental and cultural burial issues presented have been overlooked or eluded."***

Responses to floral and wetland concerns were noted above, and presumably the cultural burial issues you mention are based on your concerns over the projects' proximity to a known burial cave expressed during a telephone conversation with William Makanui of my staff the morning of March 4, 2004.

As indicated in Sections 3.1.1.and 3.3.3.2 of the DEA, during initial project planning, environmental consultants and project archaeologists identified and located burial caves in the field in order to ensure that the project would not approach or affect them. As mentioned in the DEA, the alignment of the project was intentionally revised based on their findings to avoid a known burial cave.

The actual locations of these burial caves have not been disclosed precisely in the EA to avoid attracting trespassers and looters to them. A full archaeological inventory survey of the project corridor was conducted, and it does not appear that any burials or historic sites will be disturbed by the project.

However, DHHL shares your concerns over these cultural resources and as an additional safeguard, archaeological monitoring will be actively conducted during grubbing and grading.

E. ***"The proposed DHHL funded well is to be hooked up to the existing Keonepoko Nui Reservoir via an unmetered 16" water main that will benefit commercial interests and other third parties usurping the DHHL funded infrastructure. We contest any use of these water well systems for any person other than DHHL beneficiaries."***

The new well will not be used to fill the existing Keonepoko Nui Reservoir. Instead, it will be used to fill a new reservoir that must be located at a higher elevation about a mile above the existing DHHL 2-acre farm lots.

The elevation difference between the new reservoir and the new developments in the Makuu area that DHHL is considering mauka of Keaau-Pahoa Road, as well as the 50 existing 2-acre DHHL farm lots that are not yet connected to any water source, is needed to ensure adequate water pressure. The higher elevation reservoir is also needed to provide adequate water pressure to 28 existing 5-acre DHHL farm lots located makai of Keaau-Pahoa Road that currently do not have water service. These 28 lots will be connected to the new water system via an existing "dry" 16-inch inflow waterline in Keaau-Pahoa Road that DHHL funded.

The pump to draw water from the well, as well as the well itself, the reservoir, and supporting waterlines and facilities, are all being designed with the intention of supporting both all existing DHHL farm lots which do not currently have water and new DHHL developments under consideration. Consequently, DHHL intent is to ensure that an adequate amount of well yield (water) is reserved for these purposes.

A new 16-inch waterline is proposed from the Keonepoko Nui Reservoir site to the new well site. However this waterline is intended to feed the new reservoir using a new back up pump (as explained below) to draw water from the existing wells at the Keonepoko Nui site.

The possibility exists that non-DHHL users downstream could benefit from the new well after it is in service and they are eventually connected to the "dry" 16-inch waterline in Keaau-Pahoa Road. However, such benefits would only be realized

contingent on any excess capacity remaining from the water system after DHHL has exhausted its initial reserve from the new well.

F. ***"We also contest the use of DHHL funds being used to purchase a booster pump for the county's Keonepoko Nui Well."***

The booster pump is not being purchased either for DWS or for the Keonepoko Nui Well itself. Rather, DHHL proposes to install the pump at the Keonepoko Nui Well site to provide a backup water source to fill the new reservoir (at the higher elevation) which in turn is intended to service the existing farm and any new DHHL lots.

In the event the pump at the new well (or well itself) breaks down or must be shut down for any maintenance or other reasons, the booster pump you refer to at the Keonepoko Nui Well will be used to fill the new reservoir in the interim. Water will be drawn from the Keonepoko Nui well and pumped via a proposed 16-inch waterline to the new reservoir.

Without it, the DHHL lots would be without water service whenever the (new) well or pumps are being repaired.

The alternative would be for DHHL to expend a large amount of funding to drill and develop a second well at the project site. The installation of a backup booster pump at the Keonepoko Nui site is significantly cheaper.

G. ***"If the well is placed at the beginning of the proposed easement on DHHL land, it will avoid rare plant, wet-lands and burial issues."***

The well could be situated at the beginning of the proposed easement on DHHL land as you state, however the new reservoir needs to be sited at a higher elevation to provide adequate water pressure.

Since the reservoir location is constrained by elevation requirements, the well is being sited nearby to provide a single secured enclosure (instead of two). Furthermore, the location of the well (more specifically the pump) near the reservoir provides a more economical method of operation since the pump only needs to "lift" the water out of the ground into the reservoir nearby. Locating the well north of the reservoir site means that the pump must not only "lift" the water out of the ground but must also "push" the water through pipes to get it into the reservoir. This results in a larger pump (at more cost) and power (electricity).

H. ***Recommendations***

1. ***Build onsite DHHL parcel-A, not offsite. Eliminate 7000' fenced access road.***

   As mentioned above, while the well could be situated at the beginning of the proposed easement on DHHL land, the location of the new reservoir is subject to elevation constraints. Consequently, the access road cannot be eliminated if water pressure to each of the lots is to be maintained.

   The access road will not be fenced. However, a gate will be provided at the beginning of the road and the well and reservoir site will be fenced for security purposes.

2. ***Connect farm water delivery system to DHHL well reservoir.***

   As indicated in our response to Comment E above, those farm lots (currently without water) are being connected to the new well and reservoir. Providing water to them was one of the reasons for implementing this project.

3. ***"Eliminate unmetered 16" water main to county's reservoir" and "Eliminate DHHL funding of the replacement booster pump for the county's well system."***

   As mentioned in our replies to Comments E and F, a new 16-inch (inflow) water main will be connected to a backup pump at the existing Keonepoko Nui site. This backup pump (and 16-inch inflow water main) would be used to fill the new DHHL reservoir (and provide water to DHHL lessees) in the event the new well or pump must be shut down.

   Implementing your suggestions and deleting the backup booster pump and 16-inch inflow water main would place our lessees in a precarious position whereby they would be forced to rely on a single well and pump. In the event of breakdowns, our beneficiaries would be left without continuous water service until repairs could be made.

4. ***Use DHHL funds for DHHL purposes.***

   As illustrated by our responses, this project's sole intent is to provide water to existing DHHL farm lots and new DHHL development currently under consideration.

I thank you for participating in the environmental review process and hope these responses address your concerns. Your participation in the DEA review is a valuable part of a planning process and a method of disseminating accurate information that benefits all parties.

Should you have any questions regarding the preparation or contents of the EA, please call Mr. Ron Terry of Geometrician Associates, LLC at (808) 982-5831.

Should you have any questions regarding the project itself, please feel free to call Mr. Larry Sumida of our Land Development Division at 587-6452.

Aloha and Mahalo

Micah A. Kane, Chairman
Hawaiian Homes Commission

Encl.

c: Geometrician Associates, LLC
Engineers Surveyors Hawaii, Inc.
DHHL, LDD

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

May 5, 2004

Regulatory Branch

Mr. Ron Terry
Geometrician Associates, LLC
HC 2 Box 9575
Keau, Hawaii 96749

Dear Mr. Terry:

This letter is in response to your request for comments on the proposed Maku'u Offsite Water System Phase II located in the Puna District, Island of Hawaii. We have reviewed the project information you provided with respect to the Corps' authority to issue Department of the Army permits under Section 404 of the Clean Water Act (33 USC 1344).

For regulatory purposes any stream, river, tributary, culvert or ditch with a surface connection to navigable waters is considered to be a water of the U.S. Waters of the U.S. also include wetlands. According to a 2003 U. S. Geological Survey (USGS) map, there does not appear to be any streams or tributaries within the project area.

Based on the draft environmental assessment and the wetlands assessment report, my office tentatively concurs on your wetland findings. The wetlands found in this area lack a surface connection to any stream, tributary and/or ditch, therefore these wetlands are determined to be isolated and not regulated under Section 404 of the Clean Water Act. We reserve the right to amend our concurrence should we receive information contradictory to what was submitted for our review.

Thank you for your cooperation with the Corps Regulatory program. If you should have any questions, you may contact Ms. Lolly Silva at (808) 438-7023 or by fax at (808) 438-4060. Please refer to file number **200400178** in any future correspondence with this office regarding this project.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

May 13, 2004

Mr. George P. Young, P.E.
Chief, Regulatory Branch
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Young:

Subject: Draft Environmental Assessment (EA)
Maku`u Offsite Water System Phase 2

Thank you for your letter of May 5, 2004, concerning both the Draft EA and follow-up material that was sent to Ms. Lolly Silva of your staff. I would like to acknowledge your concurrence with our findings that the wetlands in this area are isolated and thus not regulated under Section 404 of the Clean Water Act.

We appreciate you and your staff assisting us with the environmental review of this project should you have any questions pertaining to the preparation or contents of the EA, please call Mr. Ron Terry of Geometrician Associates, LLC at (808) 982-5831.

Should you have any questions regarding the project itself, please feel free to call Mr. Larry Sumida of our Land Development Division at 587-6452.

Aloha and Mahalo

Micah A. Kane, Chairman
Hawaiian Homes Commission

c: Geometrician Associates, LLC
Engineers Surveyors Hawaii, Inc.
DHHL, LDD

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

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ATTENTION OF

May 5, 2004

Regulatory Branch

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Geometrician Associates, LLC
HC 2 Box 9575
Keau, Hawaii 96749

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Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

MAKU`U OFFSITE WATER SYSTEM PHASE 2

ENVIRONMENTAL ASSESSMENT

APPENDIX 3

ARCHAEOLOGY AND

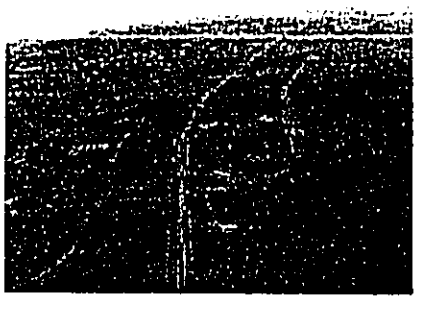
CULTURAL IMPACT REPORT

RC-0190

Archaeological and Limited Cultural Assessment for the Proposed DHHL Maku'u Water System

(TMK: 3-1-5-08:01)

Hālona and Maku'u Ahupua'a
Puna District
Island of Hawai'i



PREPARED BY:

Robert B. Rechtman, Ph.D.

PREPARED FOR:

Ron Terry, Ph.D.
Geometrician
HC R 2 Box 9575
Kea'au, Hawai'i 96749

December 2003

RECHTMAN CONSULTING, LLC
HC 1 Box 4149 Kea'au, Hawai'i 96749
phone: (808) 966-7636 toll-free fax: (800)406-2665
e-mail: bob@rechtmanconsulting.com
ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

Archaeological and Limited Cultural Assessment for the Proposed DHHL Maku'u Water System
(TMK: 3-1-5-08:01)

Hālona and Maku'u Ahupua'a
Puna District
Island of Hawai'i

RECHTMAN CONSULTING

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INTRODUCTION

At the request of Ron Terry, Ph.D., on behalf of his client the Department of Hawaiian Home Lands (DHHL), Rechtman Consulting, LLC performed an archaeological and limited cultural impact assessment for a proposed water well/reservoir and delivery system (waterline) to supply water to DHHL beneficiaries at the Maku'u Farms and Agricultural Subdivision. The proposed infrastructural developments will occur on state-owned land (TMK:3-1-5-08:01) in Hālona and Maku'u *ahupua'a*, Puna District, Island of Hawai'i (Figures 1 and 2). The purpose of this study is to document the presence of any historic properties (including traditional cultural properties) that might exist within the project area, assess the significance of any such resources, and provide a statement of impact to any such resources as a result of the proposed water system development.

This report is intended to accompany an Environmental Assessment (EA) being prepared in compliance with Chapter 343 Hawai'i Revised Statues, as well as fulfilling the requirements of the County of Hawai'i Planning Department and the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) with respect to permit approvals for land-altering and development activities. The water system project is also receiving support from the U.S. Department of Housing and Urban Development (HUD), therefore the EA is also intended to comply with the National Environmental Policy Act (NEPA) and its implementing regulations; thus, this archaeological and limited cultural impact assessment will adhere to Section 106 of the National Historic Preservation Act and its implementing regulation, 36 CFR 800.

In the *draft* Hawai'i Administrative Rules (draft HAR 13§13-275-2) that would govern the regulatory activities of the State Historic Preservation Division, a definition of historic property is provided.

> "Historic property" means any building, structure, object, district, area, or site, including *heiau* and underwater site, which is over 50 years old.

This definition should not be confused with the definition of Historic Property contained in the Federal legislation and its implementing regulation (Section 106 of the National Historic Preservation Act and 36 CFR 800, respectively), where Historic Property is defined as a resource "listed or eligible for listing in the National Register of Historic Places." The difference being that in the state-used definition ALL buildings, structures, objects, districts, areas, or sites older than fifty years are historic properties and need to be assessed as such. In the Federally used definition, ONLY those buildings, structures, objects, districts, areas, or sites that are determined to be significant are considered Historic Properties.

The criteria for the evaluation of significance contained in the *draft* Hawai'i Administrative Rules generally follows that which was promulgated by the Federal government, with the addition of Significance Criterion E, which is not contained in the Federal evaluation criteria. To be significant the resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

A Be associated with events that have made an important contribution to the broad patterns of our history;

B Be associated with the lives of persons important in our past;

C Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

D Have yielded, or is likely to yield, information important for research on prehistory or history;

E Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

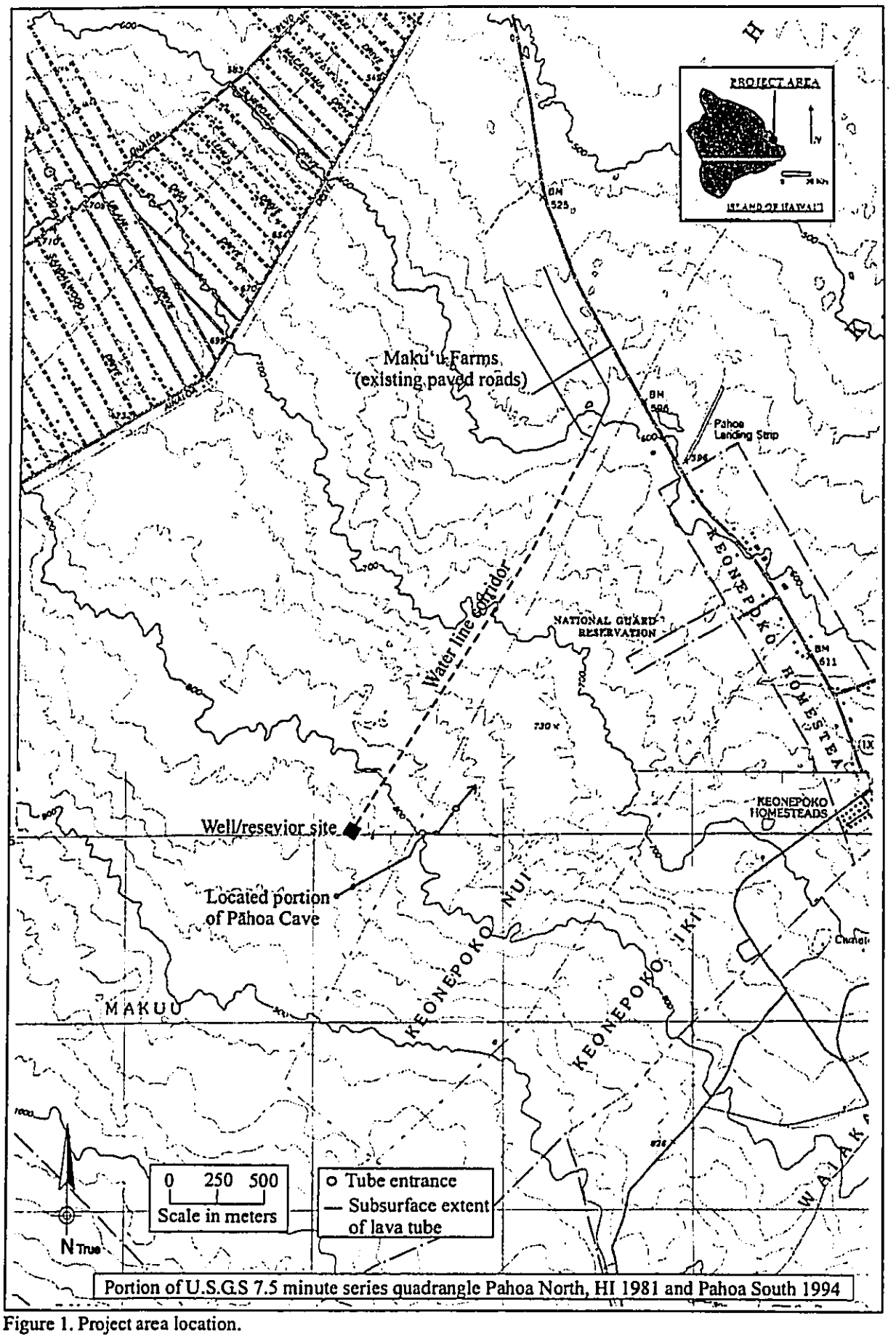

Figure 1. Project area location.

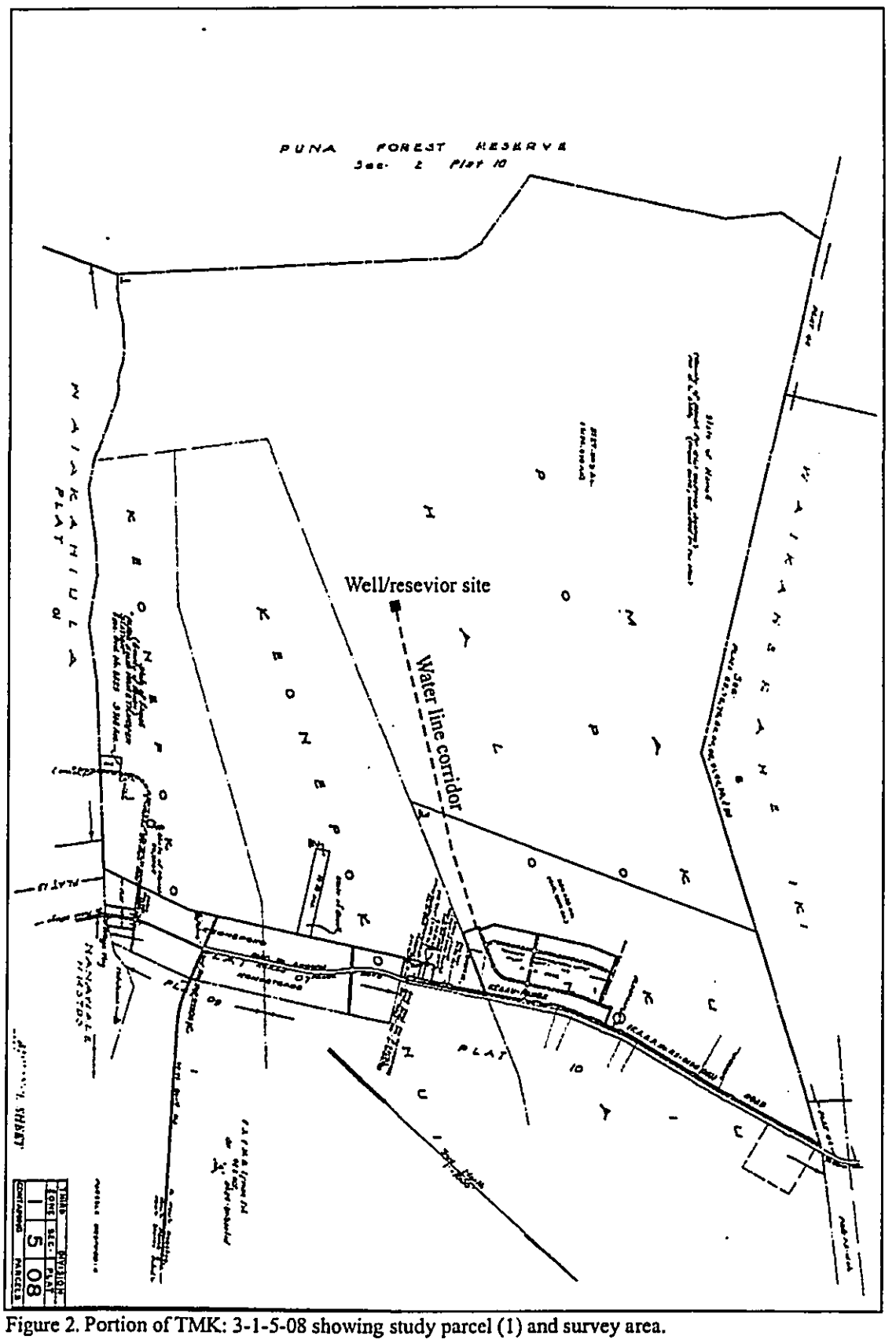

Figure 2. Portion of TMK: 3-1-5-08 showing study parcel (1) and survey area.

A working definition of Traditional Cultural Property is as follows:

> "Traditional cultural property" means any historic property associated with the traditional practices and beliefs of an ethnic community or members of that community for more than fifty years. These traditions shall be founded in an ethnic community's history and contribute to maintaining the ethnic community's cultural identity. Traditional associations are those demonstrating a continuity of practice or belief until present or those documented in historical source materials, or both.

The origin of the concept of Traditional Cultural Property is found in National Register Bulletin 38 published by the U.S. Department of Interior-National Park Service. "Traditional" as it is used, implies a time depth of at least 50 years, and a generalized mode of transmission of information from one generation to the next, either orally or by act. "Cultural" refers to the beliefs, practices, lifeways, and social institutions of a given community. The use of the term "Property" defines this category of resource as an identifiable place. Traditional Cultural Properties are not intangible, they must have some kind of boundary; and are subject to the same kind of evaluation as any other historic resource, with one very important exception. By definition, the significance of Traditional Cultural Properties should be determined by the community that values them.

PROJECT AREA DESCRIPTION

The current project area is located *mauka* of Highway 130 roughly 1.5 mile south of the ʻĀinaloa Subdivision and 2 miles west of Pāhoa Town ranging in elevation from 600–850 feet above sea level (see Figure 1). The survey area consists of a proposed access road and waterline corridor (50 feet wide) extending for roughly 7,000 feet (2.1 kilometers) in a westerly direction to a proposed well/reservoir site measuring 200 feet by 200 feet. With respect to possible Historic Properties the area of potential effects (APE) for this study is the footprint of the water well/reservoir and the pipeline and access road.

The soil in the study area is primarily classified as a histosol; a thin soil that develops on geologically young, yet forested lava. Starting around 1,000 feet elevation (just above the study area) there are also limited pockets of more developed soils of the Kekake-Keei-Kiloa series and Haipoe-Maile-Puu Oo series (Sato et al. 1973), these are thin rocky soils that overlay an ʻAilaʻau flow dated between 260-450 years B.P. (Holcomb 1987). The vegetation regime of the study area (Figure 3) is classified as Lowland Wet ʻŌhiʻa/Uluhe Fern Forest (Gagne and Cuddihy 1990). *ʻŌhiʻa* (*Metrosideros polymorpha*) are abundant but generally small and sparsely distributed among patches of *uluhe* (*Dicranopteris linearis*) and broomsedge (*Andropogon virginicus*). *Melastoma candidum* is also prevalent within the study area. Table 1 lists the plant species identified during a recent floral survey (Terry 2003) of the study area.

Table 1. List of identified plant species (from Terry 2003).

Scientific Name	Common/Hawaiian Name	Status
Andropogon virginicus	Broomsedge	Alien
Arundina graminifolia	Bamboo orchid	Alien
Bothriochloa pertusa	Pitted beard grass	Alien
Cibotium glaucum	Tree fern/*hāpuʻu*	Endemic
Cladium jamaicense	Sawgrass	Indigenous
Desmodium incanum	Spanish clover	Alien
Dicranopteris linearis	False staghorn fern/*uluhe*	Indigenous
Fimbristylis dichotoma	Fimbristylis	Indigenous
Lycopodiella cernua	Club moss/*līnui ʻahu ʻula*	Indigenous
Machaerina mariscoides	Sedge/*ʻuki*	Indigenous
Melaleuca quinquenervia	Paperbark	Alien
Melastoma candidum	Melastoma	Alien
Metrosideros polymorpha	*ʻōhiʻa lehua*	Endemic
Mimosa pudica	Sensitive plant	Alien
Nephrolepis cordifolia	Sword fern/*kupukupu*	Endemic
Paraserianthes falcataria	Albizia	Alien
Pluchea symphytifolia	Scurbush	Alien
Psidium cattleianum	Strawberry guava	Alien
Pteris cretica	Cretan brake	Indigenous
Santalum paniculatum	Sandalwood/*ʻiliahi*	Endemic
Scaevola chamissoniana	*naupaka kuahiwi*	Endemic
Spathoglottis plicata	Philippine ground orchid	Alien
Sphenomeris chinensis	Lace fern/*palaʻā*	Indigenous
Stachytarpheta sp.	Vervain	Alien
Waltheria indica	*ʻahualoa*	Indigenous
Xyris complanata	Yellow-eyed grass	Alien

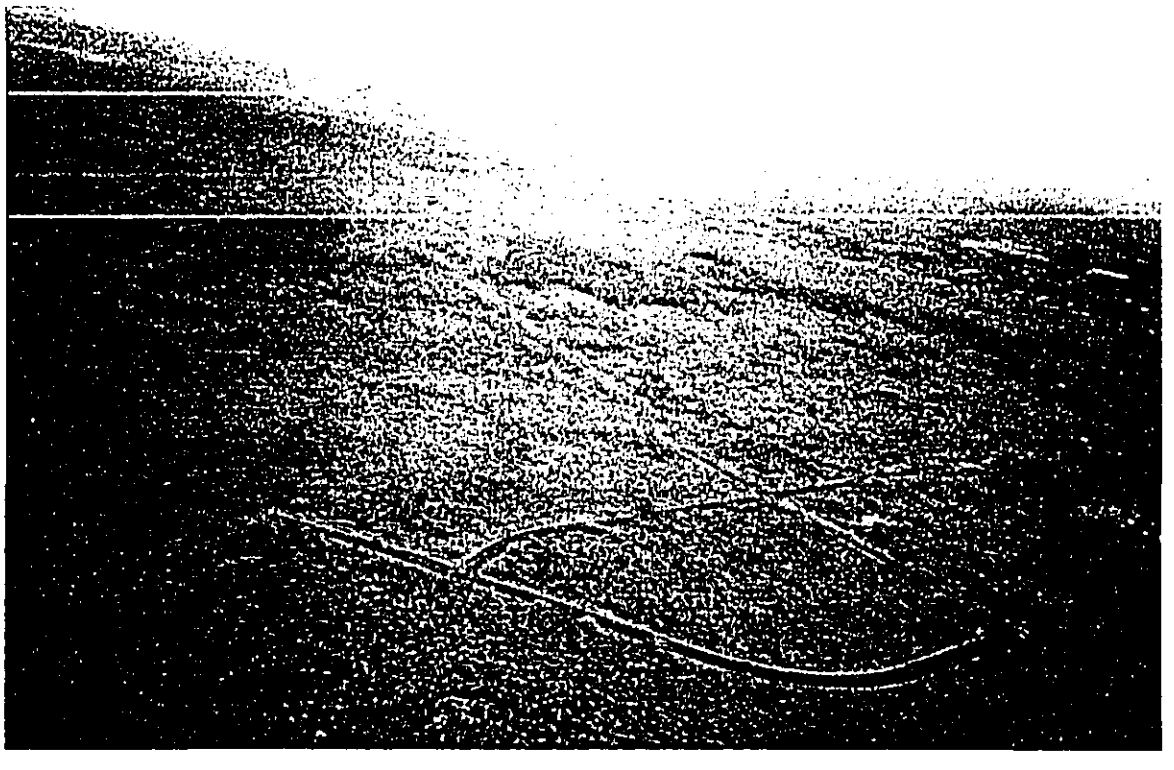

Figure 3. Aerial photograph showing the environment of the general project area.

BACKGROUND STUDIES

This section of the report describes and synthesizes prior archaeological, cultural, and historical studies (Table 2) that are relevant to the current project area; and provides a brief culture-historical background. McEldowney (1979) authored an archaeological and historical literature review and research design for the south Hilo and Puna areas, which can be used as a general predictive model for archaeological site distributions within the current study area. This model is based on ethnohistorical and early historical observations and descriptions of the region; and has been supported by several subsequent archaeological studies, some of which (Figure 4) have taken place in the same, or adjacent, *ahupua'a* as the current study area (Barrera 1990; Bordner 1977; Chaffee and Spear 1993; Charvet-Pond and Rosendahl 1993; Conte and Kolb 1994; Ewart and Luscomb 1974; Franklin et al. 1992; Komori 1987; McEldowney and Stone 1991; Smith 1991; Yent 1983).

Table 2. Prior relevant archaeological, historical, and cultural studies.

Author/Date	*Type of Study*	*Ahupua'a*
Barrera 1990	Archaeological Survey	Maku'u
Barrère 1959	Archival and Historical Literature Review	Various
Bordner 1977	Archaeological Survey	Maku'u
Chaffee and Spear 1993	Archaeological Survey	Maku'u
Charvet-Pond and Rosendahl 1993	Archaeological Survey	Maku'u, Hālona, Pōpōkī
Conte and Kolb 1994	Archaeological Survey	Maku'u, Hālona, Pōpōkī
Ewart and Luscomb 1974	Archaeological Survey	Various
Franklin et al. 1992	Archaeological Survey	Waikahkahe
Komori 1987	Archaeological Survey	Various
Maly 1999	Archival and Oral-Historical Study	Various
McEldowney 1979	Literature Review and Research Design	Various
McEldowney and Stone 1991	Archaeological/Environmental Survey	Various
Smith 1991	Field Inspection	Hālona, Pōpōkī
Yent 1983	Archaeological Survey	Maku'u

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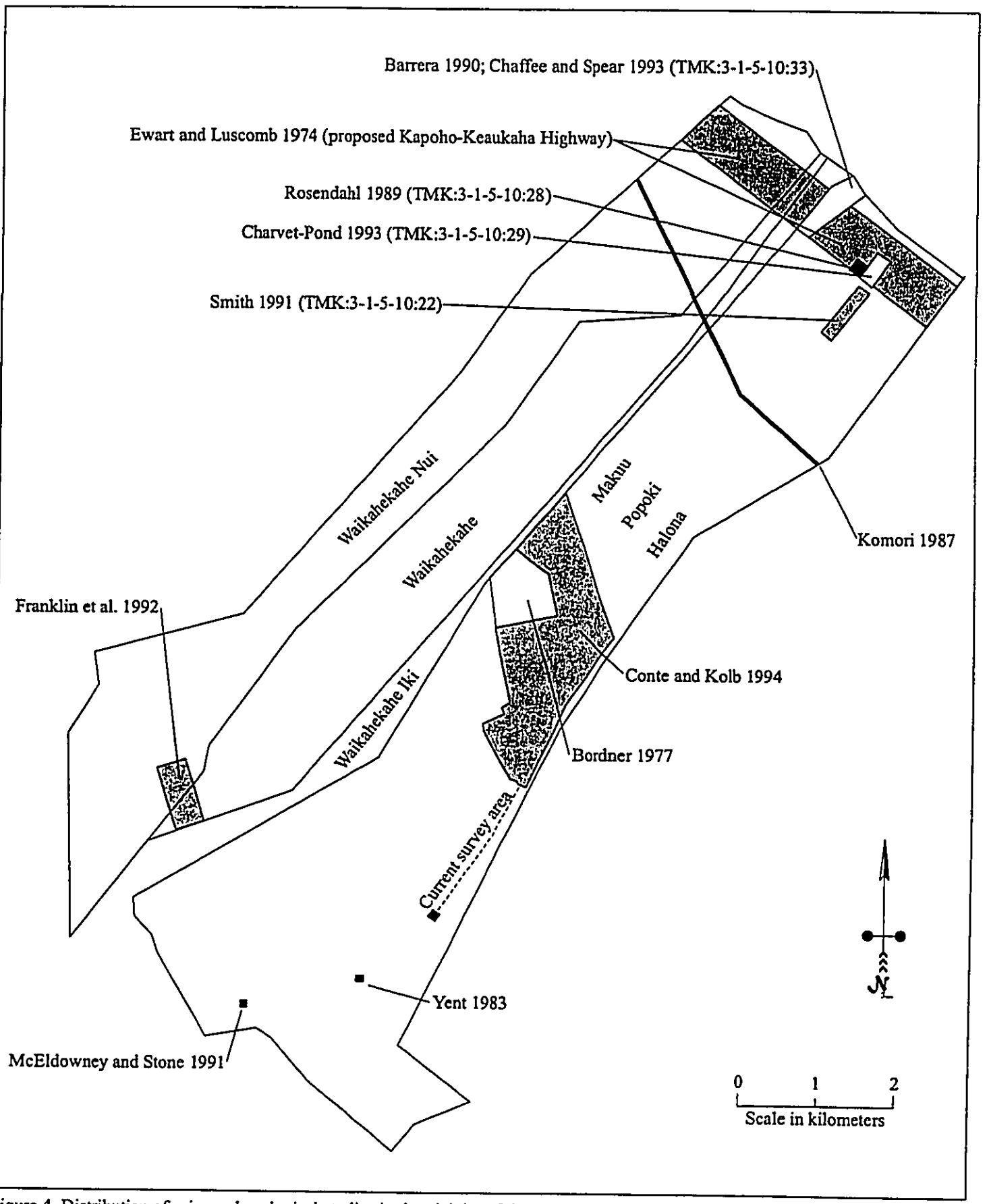

Figure 4. Distribution of prior archaeological studies in the vicinity of the current project area (adapted from Conte and Kolb 1994).

Of the archaeological studies listed in Table 2, five (Bordner 1977; Conte and Kolb 1994; Franklin et al 1992; McEldowney and Stone 1991; Yent 1983) were conducted in inland areas comparable to the current study area. Aside from the extensive lava tube systems documented in two of these studies (McEldowney and Stone 1991; Yent 1983), only three other features were recorded in a over 2,000 acres of total survey area (Bordner 1977; Conte and Kolb 1994; Franklin et al. 1992). One of these features was an *ahu*, or cairn (Bordner 1977); and the other two were small terraces interpreted as agricultural planting areas (Franklin et al. 1994). This lack of archaeological features is understandable considering that most of the area is on a relatively young lava flow. It is however, interesting to speculate about the potential cultural significance of the flow itself. This part of Puna was no doubt inhabited when the flow occurred sometime during the sixteenth or seventeenth century. Based on specific ethnographic analogy (with historic lava flows in Kona and Ka'ū) it is likely that this flow was a storied event with cosmologic and mythical associations. There is no specific legend however, that has survived to the present.

Hālona, Pōpōkī, and Maku'u *ahupua'a* are portions of the larger Puna District, one of six major districts on the island that remain intact today. This division of districts (and likely all of the smaller land divisions) extends back in time to at least A.D. 1475, in the time of the Chief Līloa; and were brought together under a single ruler when 'Umi a Līloa (son of Līloa) came to power in about A.D. 1525 (Maly 1999). Barrère (1959) summarizes the Precontact geopolitics of the Puna District as follows:

> Puna, as a political unit, played an insignificant part in shaping the course of history of Hawaii Island. Unlike the other districts of Hawaii, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Kau and Hilo. (Barrère 1959:15)

The Puna District generally remained under the control of outside chiefs until the time of Kalani'ōpu'u's reign. Shortly before his death in A.D. 1782, Kalani'ōpu'u's dominion over Puna and portion of Ka'ū was challenged by the Puna chief 'Īmakakōloa. Kalani'ōpu'u resolved the unrest, but following his death the disposition of Puna once again became an issue until Kamehameha I successfully brought the entire island under his control in A.D 1793.

As a result of the *Māhele* of A.D 1848, Maku'u, Hālona, and Pōpōkī *ahupua'a* were retained as government land. Large coastal portions of these land units (Figure 5) were later commuted as grants (in A.D 1852 Grant 1013 to Maiau and Grant 1014 to Kea, and in A.D 1855 Grant 1537 to Kapohano); the *mauka* lands have since remained idle. By the 1890s the government was investigating ways to improve access and resources in Puna. In A.D 1892 Loebenstein was directed to survey a new inland road (roughly in the location of the current Highway 130) through the district. In a newspaper interview, he describes the area as follows:

> The arable belt of Puna is from three to six miles from the sea coast, and is consequently unexplored. It is a wonderful country and I could talk of it by the hour. It only lies in the hands of the Government to develop it. Everything depends on an appropriation being made for the road, of which the preliminary survey has been made.
>
> . . . The road begins at the edge of the Ramie camp, one mile from the edge of the woods–nine miles from Hilo. It follows the old road for a mile and a half more, and is to extend to Kaimu on a new survey . . . I met with ancient trails showing traces of a dense population and cultivation in early times. The road, if opened, will afford beautiful scenery to tourists, as there are natural wonders all along, lava trees, pit craters and lava tunnels extending for miles which formed ancient burial places. There are natural benches formed by the lava, where the dead were placed, and on these are the bones, skulls and sometime complete skeletons. These tunnels are from 25 to 30 feet wide and about the same in height, and of course pitch dark . . . From the ninth to the nineteenth mile [the current study area is at about the ninth mile] the road is over *pahoehoe*, the arable land lying about a mile and a half above . . . There is considerable sandal wood growing on the *pahoehoe*, but the ranchers are too indolent to drive cattle, so they make fires and burn off the brush, which kills the sandal wood. It is a shame. There are no wild cattle in Puna . . . (Hawaiian Gazette, March 22, 1892)

A Hawaii Territorial Survey map (Register Map 2268) dated A.D 1903 shows a *mauka/makai* trail extending inland from the shore along the Hālona/Pōpōkī boundary (see Figure 6); however, it is unclear how far inland this trail may have gone, but it is possible that it provided coastal residents access to the more fertile (soil covered) lands *mauka* (above 100 feet elevation) of the current study area.

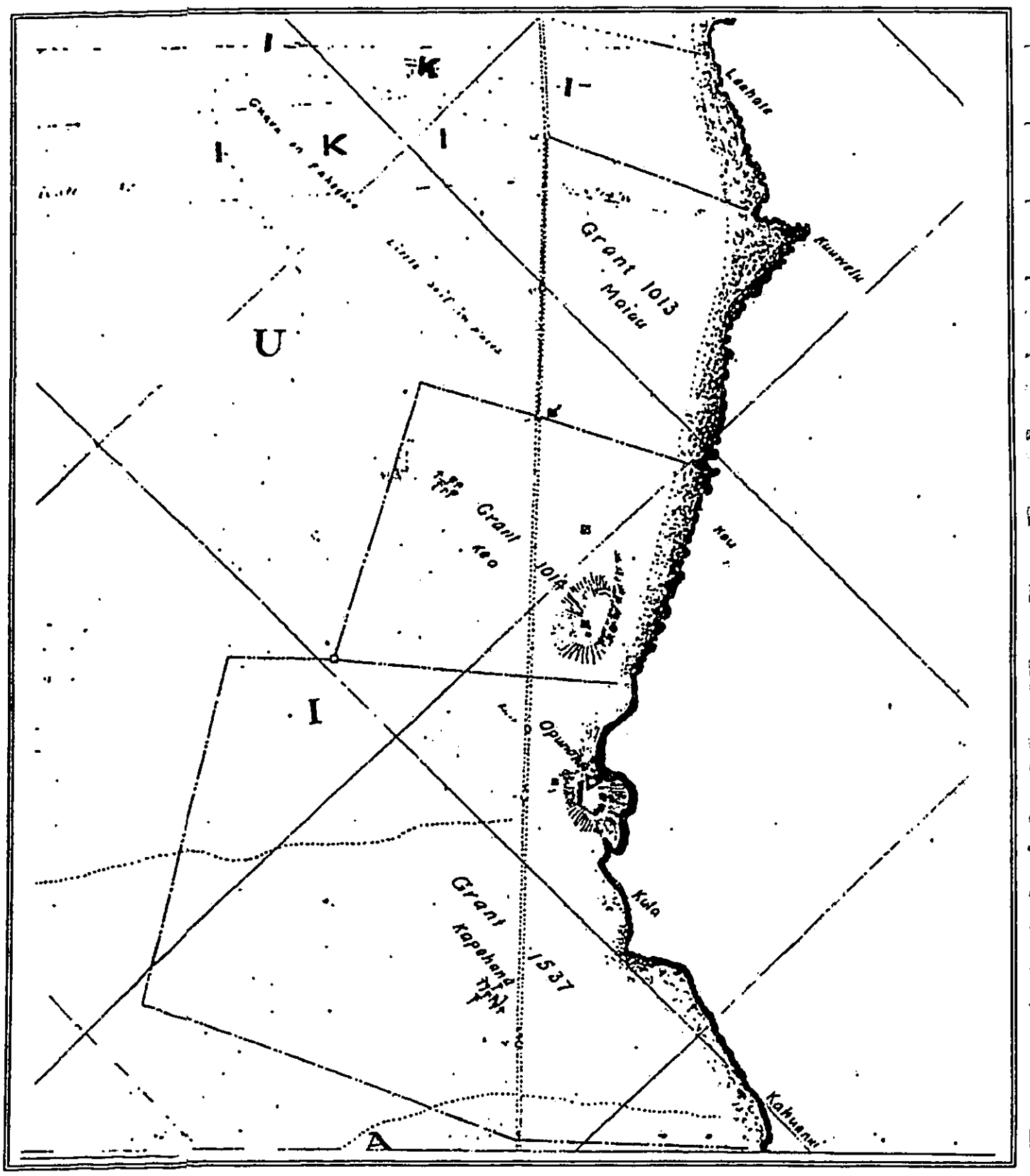

Figure 5. Portion of Register Map No. 2258 (dated 1903) showing coastal grants in Maku'u-Halōnā-Pōpōkī *ahupua'a*.

CURRENT PROJECT EXPECTATIONS

Based solely on elevation, the current project area falls within the Upland Agricultural Zone (Zone II) as defined by McEldowney (1979). However, as she indicates, this zone also corresponds with the distribution of ash soils, which do not extend into the current study area (Figure 6). The environmental qualities of the current study area are more akin to McEldowney's (1979) description of the Lower Forest Zone (Zone III). This region is characterized by scattered *'ōhi'a* with an understory of *hapu'u* and *uluhe*. Thus, the archaeological expectations for the general project area are limited to trails, localized agricultural features, ephemeral habitations, and lava tubes containing both habitation debris and burials. While undocumented in the literature, it has been suggested based on oral information (see Franklin et al. 1992:15) that lava tubes also were used as secret places in which chant, hula, and other traditional cultural activities were practiced during the period (A.D. 1830-1870s) of prohibition on such activities.

This general model can be refined for the specific study area based on the results of prior archaeological investigations (see Table 2). Collectively, these investigations document an overwhelming paucity of archaeological sites. While it is possible that some agricultural and temporary habitation features could be present in the study area, it is more likely that the only sites discoverable would be trails or trail markers and lava tubes (see Bordner 1977; Conte and Kolb 1994; Franklin et al. 1992).

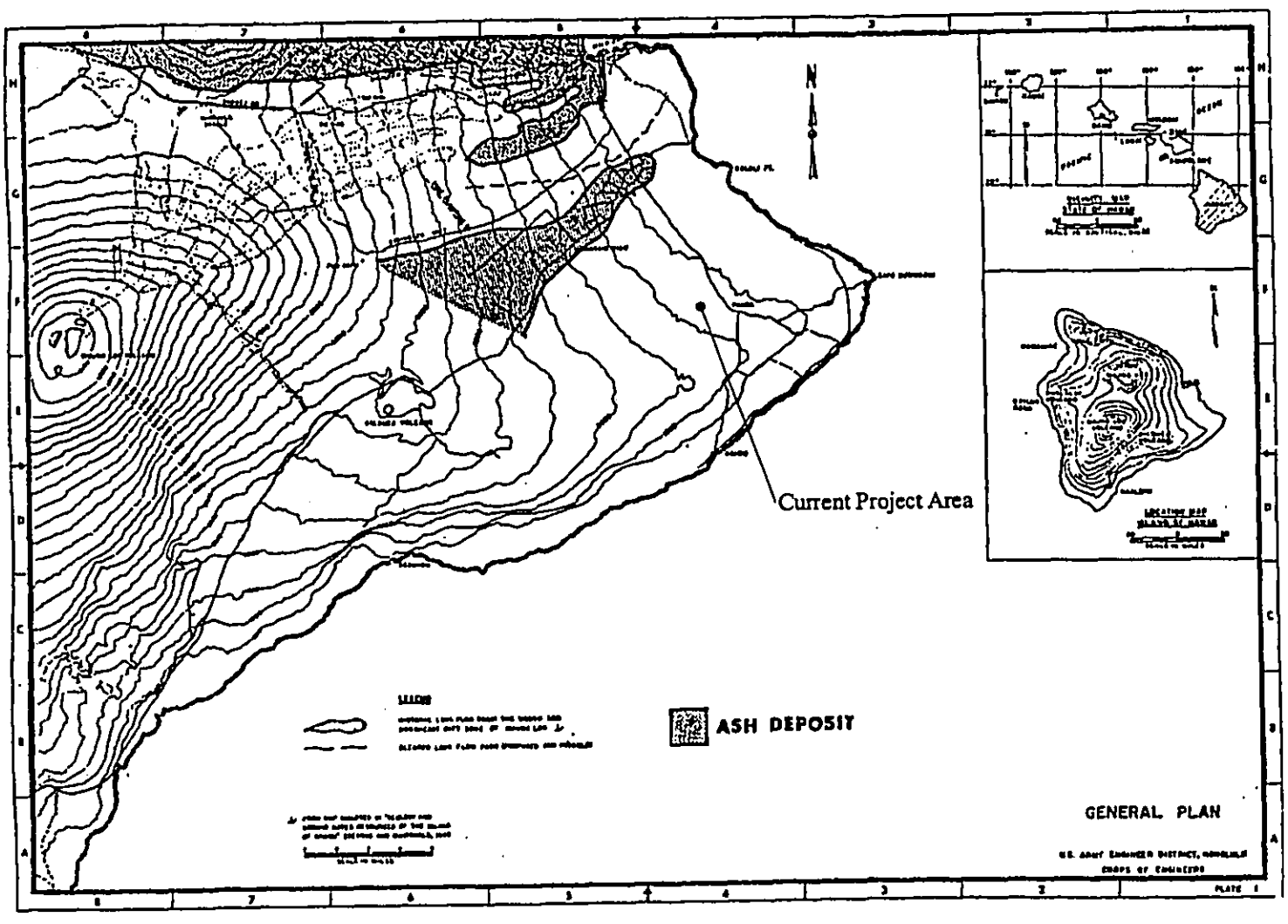

Figure 6. Map depicting locations of weather ash deposits corresponding to the Upland Agricultural Zone (adapted from McEldowney 1979:63).

FIELDWORK

October 7–9, 2003, J. Dave Nelson, B.A., Mark Winburn, B.A., Christopher Hand, B.A., and John Fogerty under the supervision of Robert B. Rechtman, Ph.D. performed a field survey of the entire project area, the limits of which were marked by surveyors. Prior to the conduct of the field survey, vegetation was cut by hand along the proposed corridor to the well/reservoir site. Vegetation cover over the proposed well/reservoir site ranged from sparse (exposed lava) to dense (thick *uluhe* stands). The entire area was systematically and intensively examined. As part of the current fieldwork, portions of the previously identified Pāhoa Cave were also inspected to see if underground passages might extend into the current study area. The fieldworkers located entrances to this lava tube system south of the current study area and explored passages with northerly trends.

No archaeological resources were observed within the project area; and none of the passages examined within the Pāhoa Cave system extended into the study area. While certain plant species (e.g., *kukui*, *kī*) were observed in the vicinity, but outside of the immediate project area suggestive of past human practices, there was no evidence indicating that the area was currently being accessed for the exercise of traditional and customary practices associated with any traditional cultural properties or resources.

CONSULTATION

As part of the current study, the Office of Hawaiian Affairs (Ululani Sherlock), the Maku'u Farmers Association (Paula Kekahuna along with several other members), and Kepā Maly (Kumu Pono Associates) were contacted in an effort to obtain information about any potential traditional cultural properties that might be present in upper Maku'u, Hālona, and Pōpōkī *ahupua'a*. In general, the elevationally intermediate portions of Puna possess a variety of floral and lithic resources that have documented cultural uses (Burtchard and Mobolo 1994; Holmes 1985; Maly 1992, 1999). Potentially, such resources would have associated cultural practices; these primarily being the gathering of plants for medicinal and ceremonial purposes. Although undocumented, the continuation of traditional gathering practices was asserted to occur in the general area. This assertion was part of the community response to the geothermal development in the region. However, none of the organizations/individuals contacted had any information relative to the existence of traditional cultural properties in the immediate vicinity of the current project area; nor did they provide any information indicating current use of the area for traditional and customary practices.

CONCLUSION AND RECOMMENDATION

It is concluded that construction of the water well/reservoir and associated delivery system and access road will likely not adversely affect any historic properties (including traditional cultural properties and associated practices). However, given the potential for undiscovered lava tubes it is recommended that an archaeological monitor be present during initial grubbing of the study area. In the event that archaeological resources are encountered during this activity, the on-site monitor can immediately secure and protect the resources and contact DLNR-SHPD as outlined in *draft* Hawaii Administrative Rules 13§13-280.

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MAKU`U OFFSITE WATER SYSTEM PHASE 2

ENVIRONMENTAL ASSESSMENT

APPENDIX 4

ANNUAL WATER QUALITY REPORT,

PAHOA AND KAPOHO SYSTEMS, YEAR 2002

Is my water safe?

Yes it is. Last year, as in years past, your tap water met all U.S. Environmental Protection Agency (EPA) and State drinking water health standards. The Department of Water Supply vigilantly safeguards its water supplies and once again we are proud to report that your system has never violated a maximum contaminant level or any other water quality standard.

Why are there contaminants in my drinking water?

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline 1-(800) 426-4791. If you have any questions regarding this Water Quality Report, call Keith Okamoto, P.E., at 961-8670.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-(800) 426-4791 .

How can I get involved?

The Water Board meets the fourth Tuesday of every month. Call for the time and location of the meeting.

You can contact us at the following numbers:

Administration/Finance/General	(808) 961-8050
Billing/Customer Service	(808) 961-8060
Engineering	(808) 961-8070
Emergencies & Field Operations	(808) 961-8790
Water Quality	(808) 961-8670

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Department of Water Supply
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Hilo, Hawaii 96720

...Water brings progress...

2002 Pahoa/Kapoho Water Systems Annual Water Quality Report

County of Hawaii

Department of Water Supply

Pahoa & Kapoho Systems Water Quality Data

The table below lists the drinking water contaminants that we detected during the calendar year of this report. The presence of contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Regulated Contaminants

			Keonepoko Nui Well Nos. 1 & 2/ Pahoa Battery Wells A & B				
Contaminants	MCL	MCLG	Level Found	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Radioactive Contaminants							
Beta/photon emitters (pCi/l)	50*	n/a	1.58	n/a	1999	No	Decay of natural and man-made deposits.
*EPA considers 50 pCi/l to be the level of concern for beta particles.							
Organic Contaminants							
Atrazine (ppb)	3	3	0.057	ND - 0.057	2002	No	Runoff from herbicide used on row crops.
Inorganic Contaminants							
Chromium (ppb)	100	100	3.0	ND - 3.0	2002	No	Discharge from steel and pulp mills; erosion of natural deposits.
Fluoride (ppm)	4	4	0.25	ND - 0.25	2002	No	Erosion of natural deposits. Water additive which promotes strong teeth. Discharge from fertilizer and aluminum factories.
Nitrate (ppm)	10	10	0.32	ND - 0.32	2002	No	Runoff from fertilizer use. Leaching from septic tanks, sewage. Erosion of natural deposits.

Key definitions of terms used in this report

- MCLG = Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk for health. MCLGs allow for a margin of safety.
- MCL = Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology
- ND = Not Detected: If a contaminant is not measured at or above its minimum detection limit, it is reported as Not Detected - detection limits are available upon request.
- ppm = Parts per million. One ppm corresponds to a single penny in $10,000 or about one minute in two years.
- ppb = Parts per billion. One ppb corresponds to a single penny in $10,000,000 or about one minute in two thousand years.
- pCi/l = Picocuries per liter.
- n/a = not applicable

Where does my water come from?

The sources of water for Pahoa and Kapoho Water Systems are Pahoa Battery Well No. A and B and Keonepoko Nui Well Nos. 1 and 2 (all of which are groundwater sources). The source(s) of supply may change depending on the supply and the demand.

Sources of drinking water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
- Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Map Not Available

MAKU`U OFFSITE WATER SYSTEM PHASE 2

ENVIRONMENTAL ASSESSMENT

APPENDIX 5

WETLANDS ASSESMENT

April 12, 2004

Lolly Silva
U.S. Army Engineer District, Honolulu
Building 230, Ft. Shafter, HI
Via e-mail: Laurene.L.Silva@poh01.usace.army.mil
From: ronterry@verizon.net

Subject: Wetlands and Draft Environmental Assessment, Maku'u Offsite Water System Phase 2

This communication follows up on our phone discussion of April 1, 2004, concerning the subject project. I am writing of behalf of the Hawai'i State Department of Hawaiian Home Lands, as their environmental consultant for this project.

As I explained in the conversation, the Draft EA's statement concerning a lack of wetlands was meant to convey our understanding that no wetlands under the jurisdiction of the U.S. Army Corps of Engineers were present. I now understand that the jurisdiction determination must be made by your agency. Pursuant to your request, I am providing additional information concerning the characteristics of the project area. It should be emphasized that DHHL has not yet attempted to undertake an official wetlands determination, nor to delineate individual wetlands, because of the considerable effort involved in properly implementing these procedures, which have not heretofore been considered necessary. Nevertheless, I believe that this letter will be of assistance in understanding the dynamics of the project area and in making your determination.

Project Setting

Most of the Puna District is covered by relatively recent lava flows. In the case of the Maku`u area, the surface is roughly 350-year old pahoehoe lava from the `Ai La`au flow of Kilauea Volcano (Wolfe and Morris 1996). The topography is hummocky, with innumerable small ridges, basins, cracks and outcrops. Despite annual rainfall exceeding 120 inches, erosion of the rock surface and physical weathering are negligible, and there has been insufficient time to form organized drainage networks. USGS 1:24,000-scale topographic maps of the area show no drainage courses (solid or dashed blue lines) within 5.5 miles of the site. Precipitation percolates through cracks in the surface rocks and creates substantial groundwater flux at the water table, which is presumed to be basal (i.e., 600-800 feet below the ground) in this area. No true soil is present, and the land is classified as Lava Lands, Pahoehoe by the U.S. Natural Resources Conservation Service (Sato et al 1973). Despite the lack of soil, vegetation is dense, and can best be classified as Lowland Wet 'Ohi'a/Uluhe Fern Forest (Gagne and Cuddihy 1990). Native 'ohi'a trees (*Metrosideros polymorpha*) are abundant but generally small (5-20 cm diameter at breast height) and sparsely distributed among patches of native uluhe (*Dicranopteris linearis*)

fern and introduced broomsedge (*Andropogon virginicus*). The introduced shrub *Melastoma candidum* is common throughout the entire project area (**Photos 1-2** depict the dominant vegetation). The combination of the rocky substrate, hummocky topography, high rainfall, and heavy vegetation creates a unique landscape. Between low trees and shrubs, most of the surface is covered with a mat of climbing ferns, but there are many bare or mossy rock outcrops (**Photo 3**). Ponds have formed where cracks in the pahoehoe become stuffed with an accumulation of decaying leaves and muck, which retards drainage. The ponds are of varying size (from about 3 to over 1,000 square feet – see **Photos 4-5**), and their variable elevations do not appear to relate to a local water table.

Evidence for Wetlands in Project Corridor

As stated before, no wetlands determination or delineation has been conducted, but I have made observations concerning these ponds in relation to the Corps of Engineers (COE) methodology for defining a wetlands (U.S. Army COE 1987). As I understand it, the COE defines wetlands by the presence of three specific indicators: hydrology, vegetation and soils. Paraphrasing from the *Wetlands Delineation Manual* (Ibid 1987:13-14), hydrologically, a wetlands is inundated either permanently or periodically during the growing season of the prevalent vegetation. Wetlands vegetation is characterized by a prevalence of hydrophytic vegetation, i.e., plants typically adapted for life in saturated soil conditions. Wetlands soils are hydric, i.e., saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation. All three criteria must be present for a site to be defined as a wetlands.

Little hydrologic data exist for the project area. However, I have seen similar ponds widely distributed throughout Puna during my 30 years of experience working in the environmental sciences in the district. They are common features in the thousands of acres of agricultural and residential lots that have been and are currently being developed in this area. The ponds at Maku'u are typical of others which I have observed to be inundated either permanently or for long periods of time, and I believe they would thus meet the hydrologic criterion for a wetlands.

Soil development in this area is rudimentary, as indicated by the NRCS classification. Sample soil pits would be problematic both in terms of practicality and meaning on such a substrate. Nevertheless, the deepest accumulation of soil-like material is found within the ponds, where a black, highly organic material is present. The environment is anaerobic and clearly reducing, and a strong sulfidic smell is often present. Although defining the boundaries of the wetlands soil might be difficult, because portions of the inundated areas contain only bare rock, it is clear that much of the substrate would meet at least a loose definition of wetlands soil.

In terms of vegetation, I have made a systematic assessment of only a few of the ponds. Generally speaking, few trees are present, but a few *Melastoma candidum* (alien, not listed in USFWS 1988 but likely FACU) shrubs appear to be rooted in the shallower portions of inundated areas. The cover is dominated by grasses (*Andropogon virginicus* – an alien FACU or UPLAND), sedges (*Rhycospora caduca* [alien FACW] and *Scleria testacea* [native FACU]), and

Xyris complanata (alien FACW) (see **Photos 4-5**). According to the COE methodology, Obligate, Facultative Wetlands, or Facultative plant species indicate wetland vegetation if they comprise 50 percent or more of the dominants. More precise vegetational assessment of individual ponds would be required to make any definitive statements, but it is likely that some, if perhaps not all, of the ponds would be determined to be dominated by hydrophytic vegetation.

In sum, the three wetlands indicator criteria – permanent or seasonal inundation, hydric soils, and hydrophytic vegetation – are probably present over most of the surface area in most, if not all, of the pond features in the project area. Under such definitions, a formal wetlands determination would likely conclude that such features were mostly wetlands.

Functions and Values

In our conversation, you requested some discussion of the functions and values of these wetlands. The following is an informal assessment of this, based on general experience with this environment with specific reference to the project area.

To a greater degree than in most areas, the major biological functions and values in Hawai'i are conservation of native plants, animals and ecosystems. Conservation of alien organisms is not a biological function, as most aliens harm the severely stressed native ecosystems in Hawai'i. Many of the plants that dominate the Maku'u ponds are aliens, but the indigenous *Scleria testacea* is also present. It is noteworthy that this plant is extremely common in wetland and upland environments around the Hawaiian Islands. The apparent lack of important native wetlands obligate species would tend to indicate that these ponds are not unique or highly important areas for conservation of native plant species, but their importance in the general landscape ecology should not be dismissed out of hand. It is noteworthy, however, that the plant community of the upland forest matrix – which includes endemic sandalwood and naupaka as well as 'ohi'a and uluhe – is arguably of higher biological function and value than the ponds. It is unknown to what degree these ponds provide habitat for native insects. The presence of alien predators such as frogs and rats may have severely altered the native insect fauna in this area, as it has in many lowlands.

Hydrological functions include flood-storage, erosion control, and filtering of sediment, nutrients, and other pollutants. The small size of the individual ponds and the lack of flood zones in the area mean that actual ponds that would be affected by the proposed project probably have very modest value in terms of flood protection. The area upgradient of the project area is entirely natural and thus produces no manmade pollution that these ponds might help filter or buffer, and there are few sensitive areas downgradient.

Other wetlands functions include scenery, fishing and gathering. Any scenic impacts of the project are tempered by the lack of sensitive viewplanes in the area, as it is not visible or accessible. Some pig-hunting and hiking may occur in the area, although based on the lack of trails (except a few associated with illicit marijuana cultivation) any such use is likely very light. The ponds do not appear to be relevant to any recreational use of this area.

In general, these ponds appear to have relatively few functions with modest value, and they do not appear to have uniquely different functions from the uplands in the same areas. Importantly, the proposal would convert only a very small percentage of this State parcel to developed uses, and the vast majority of the area would remain as-is, continuing to perform the same functions and values.

If you have any further questions, please feel free to call me at (808) 982-5831, or e-mail to ronterry@verizon.net. I would be happy to lead a field visit of the area, or to provide you directions if you wish to conduct one on your own.

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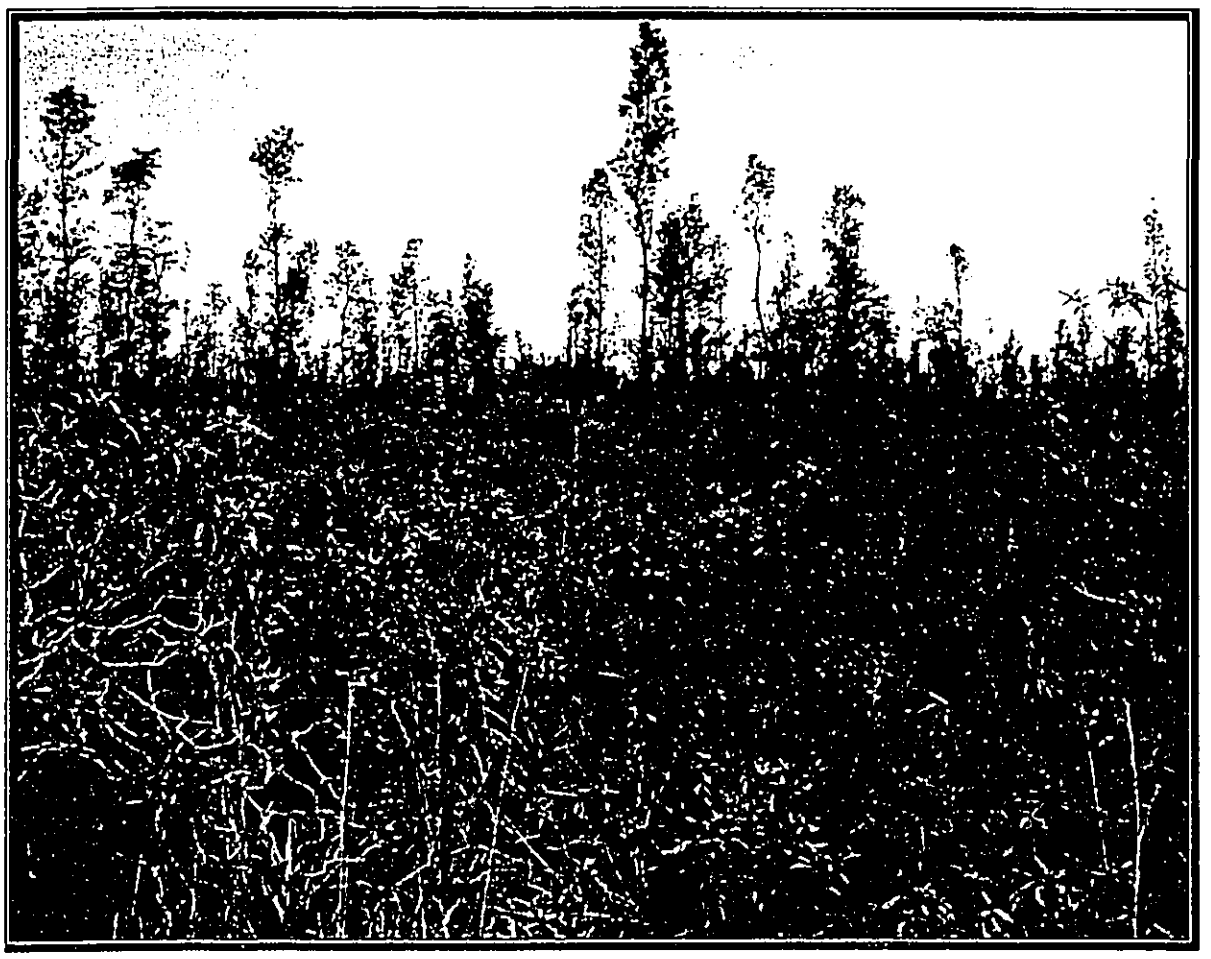
PHOTO 1



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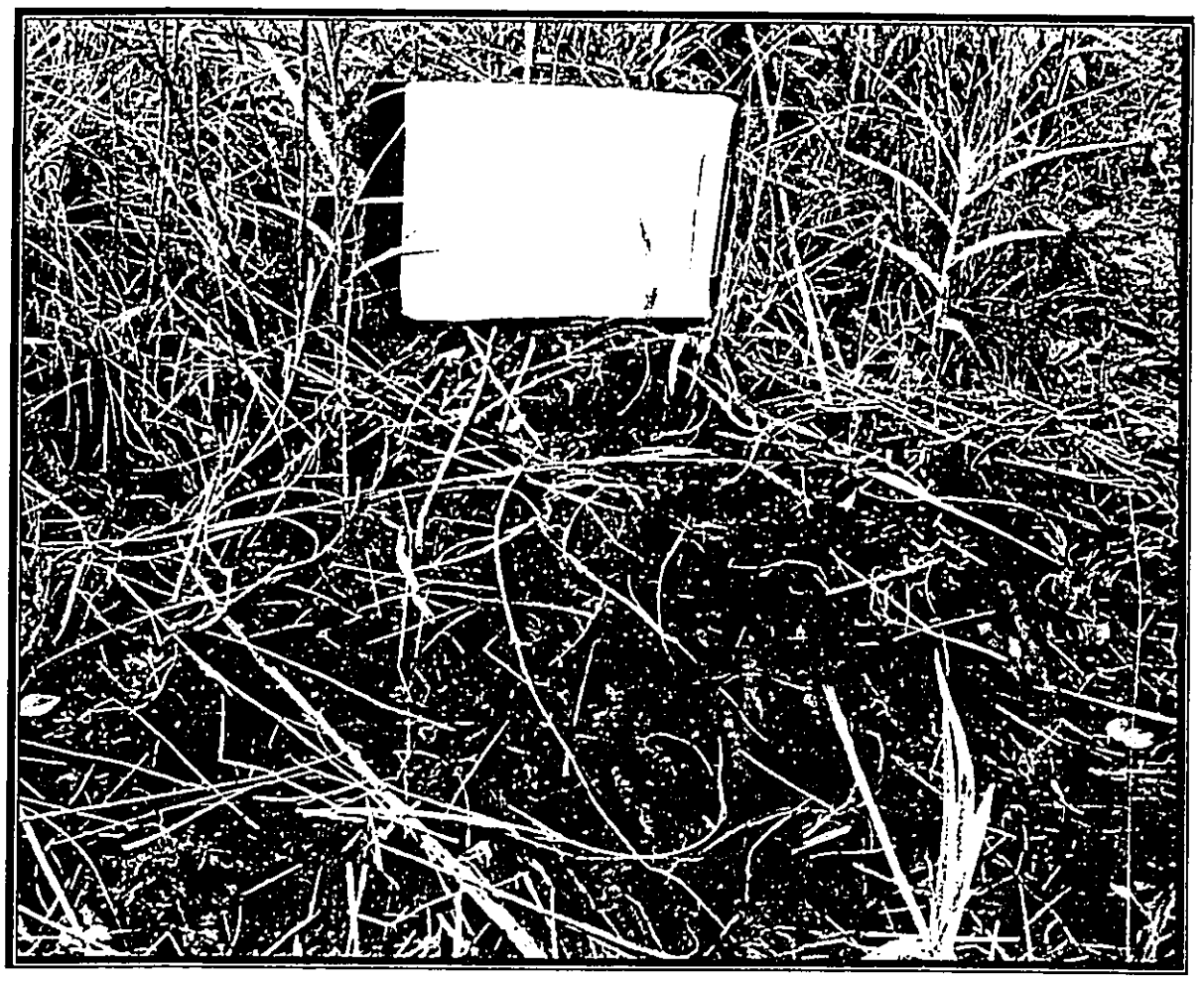

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PHOTO 4

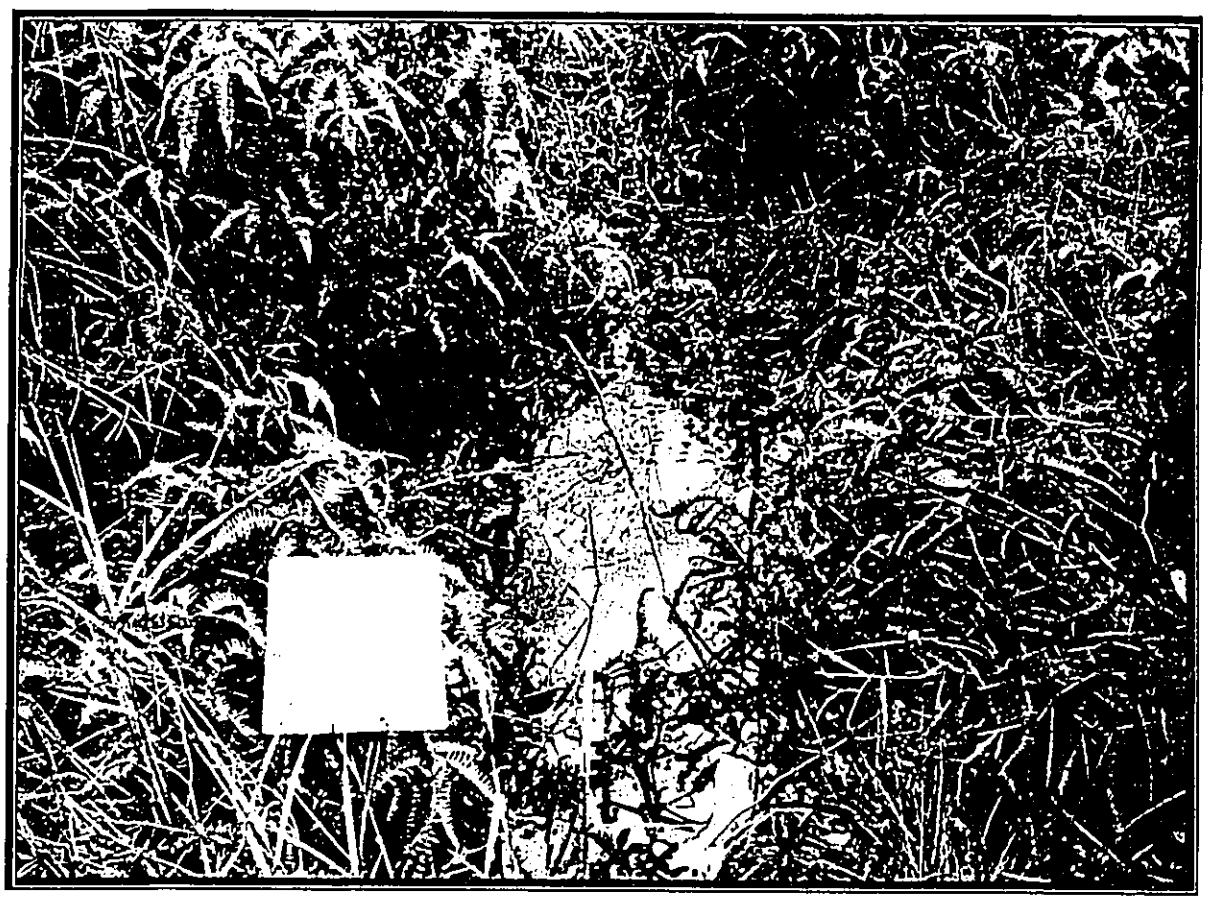

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PHOTO 5